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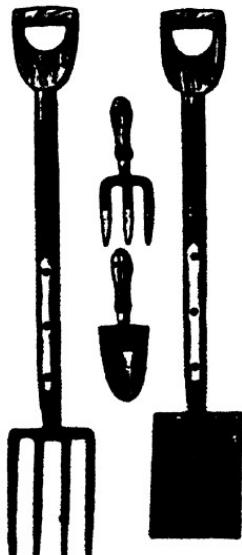
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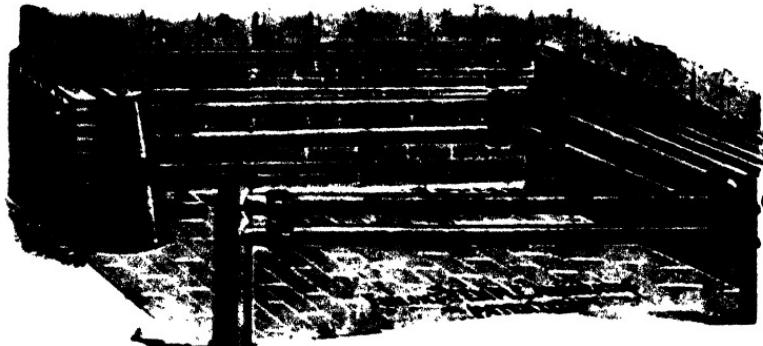
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BEETON'S
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BEETON'S GARDENING BOOK.

PART I.

THE GARDEN AND THE WORK THAT IS DONE IN IT.

INTRODUCTORY.

WHEN a man becomes the possessor of a garden, whether as owner or tenant, it will be found that there are three conditions in one or the other of which it must of necessity be. Thus, firstly, it may be new ground utterly innocent of form and arrangement which has to be brought into a fit state for the culture of flowers, vegetables, and fruits ; secondly, it may be a garden which is in cultivation and ready to hand throughout — a garden which has been well worked, well kept, and well stocked, and therefore a garden in its prime ; or, thirdly, it may be an old garden which requires renovating and bringing once more into proper form and capability of yielding remunerative crops.

But in whichever condition the garden ground may be, it will be clear to the dullest comprehension that each will be subject in a greater or less degree to three different kinds of treatment, which may be briefly summarised as Formation, Maintenance, and Restoration, one of which must of necessity predominate in the treatment of the ground or garden when it first passes into the occupier's hands. Thus in the ground that is not yet a garden Formation will take the lead, to be followed in due course by Maintenance ; in the garden that is a garden in every sense of the word, Maintenance obviously is all that is necessary, subject possibly to alterations at the will of the possessor in order to render it in accordance in some point or another with his own peculiar and personal ideas of what a garden ought to be ; and in the case of the old and worn-out garden Restoration will take

INTRODUCTORY.

the lead, to be followed by Maintenance when the work of renovation has been accomplished.

Maintenance, therefore, which is necessary in every garden whether new, or in its prime, or old, is the most important of the three modes of treatment to which all gardens must be subjected according to their condition. Formation is the threshold, so to speak, of garden work ; but Renovation, or, as it may be otherwise called, Re-formation, is a matter that is always in the distant future of a garden, and may be said to be due only to neglect of Maintenance.

Yet, after all, the same processes are necessary, and the same processes must be carried out in every stage of a garden's progress, and this leads up aptly enough to the point that in a book about gardening designed for general use, it is desirable first of all, in the interest of those who may be chiefly concerned about Formation, to consider briefly the principal points which affect the garden itself—namely, its aspect, the distribution of its area for various purposes, the means and modes of thus dividing its area, its enclosure and protection from intrusion of anything that may be hurtful or detrimental, and minor methods of ornamentation ; secondly, the operations on the ground itself or immediately connected with garden work ; thirdly, the tools by which all such operations and all kinds of garden work are effected ; fourthly, the enrichment of the soil ; and, fifthly, the means adopted for the propagation of flowers, vegetables, and fruits from a general point of view ; to be followed by a brief survey of any points which cannot be conveniently classified under any of the preceding heads, but which, nevertheless, must not be altogether neglected or omitted in any book which is professedly a reliable guide to Garden Work and all that falls in a general way within its scope.

Such is a necessarily brief survey of the mode of treatment to be followed in this the first part of this volume, which certainly has the merit of possessing advantages which will be patent to every reader as he proceeds. There is nothing in it that is new or novel, perhaps, but it is a convenient and common-sense way of bringing hints, suggestions, and information concerning Garden Operations before common-sense people. The love of gardening among Englishmen and Scotchmen, too, is steadily on the increase, and has been so for a long series of years ; and therefore the demand for such handbooks as these in which gardening as it ought to be done is described briefly but tersely, and in a manner which the lowest capacity ought to be able to grasp and assimilate. But even as the proof of the pudding is in the eating, so does the value of a book depend on the character and correctness of the information that is gathered and stored in its pages ; and, without doubt, this will stand, as it has stood for years, the test of close and rigid examination.

Following, then, the mode of treatment of the subject-matter of this Section of BEETON'S NEW GARDENING BOOK as marked out above, our first and earliest remarks must be directed to the

ARRANGEMENT OF COTTAGE AND VILLA GARDENS.

Preliminary.—Gardens of villa residences in the suburbs of towns and cottages in the country vary in size, shape, position, and aspect: some are square, some perhaps trapezoidal, or a greater number oblong, and others irregular in form, ranging in size from a couple of rods, or about 60 square yards, to a quarter of an acre, or about 1,200 square yards. The mode of laying out any garden must be influenced and ultimately determined by the size, shape, position, and aspect of the piece of ground to be treated. Let us endeavour to lay down some general rules for our guidance in the disposition of small gardens, and then we shall be in a better position to apply them to a special piece of ground that may be taken as the prevailing type of a small villa or cottage garden.

Laying Out.—First, then, in laying out a small garden, economy recommends simplicity of design, for intricate plans only increase the labour, and do not yield an adequate compensation. Still, there is a limit even to simplicity of design, and this should be carried only so far that it may not interfere with as much diversity as possible, for there is nothing that increases the pleasure to be derived from a small garden, or apparently adds to its extent, than as many objects as possible, prominently brought out here and there to attract and rivet attention by turns as each comes under notice in a walk round the garden, whenever it may be taken. Supposing the frontage to be laid out as a flower garden, let the walks present curves rather than sharp angles, let the beds be circular or oval rather than pointed, and let the space for flowers be as open as possible. Nothing

is more beautiful than a small green plot of grass on which one or two of the smaller ornamental trees may be planted, such as the silver birch or copper beech, or some sort of conifer, as a pine or cypress, an araucaria, now easily procurable, or a cedar. These do not create such a litter with their leaves as free-growing plants, and will not so soon overcrowd the place, as they grow but very slowly and are many years in attaining their full size, a matter of considerable importance in such positions as are mentioned above.

Edging and Paths.—Let the edgings of the flower beds, where edging is necessary, be of box, if obtainable nothing is so handsome; otherwise thrift, white alyssum, or some of the ornamental grasses; or ornamental tiles are both cheap and elegant, and a grass verge from 6 to 9 inches wide, if kept in order, is always pleasant and attractive to look on. The path should be of gravel, if possible, or of coarse sand— even road sand is capital for kitchen garden walks, so also is burnt clay. In the present day, walks are sometimes made of a concrete of tar and pebbles, rolled and faced with sand, or of asphalt, but these kinds of walks are not desirable, except in such positions where it is desirable to find the path firm and dry even immediately after heavy rain.

Drainage.—Let the main parts of the ground be devoted to kitchen crops. If drainage is necessary, ascertain whether the water can be carried. Open a trench along the whole breadth of the plot, either into the intended outlet or into a well sunk in the ground, and into this trench lead the several drains from the higher part of the ground from one end of the garden to the outlet, gradually sloping towards the lower

PREPARATION OF MANURES.

trench. If this be left open and kept clear, it will carry off all superfluous water; but if some brushwood is laid along the bottom, it may be covered and cropped over. Brick-bats or stones will do, but pipes or tiles are to be preferred. Having done this, see to the construction of the walls; if pleasure be the object, do not grudge the space to be given up to them; but it must be sought after by keeping as much of the ground as possible for cultivation, let one man walk

quicklime will remove any offensive smell. Let the offal, dung, &c., be laid in layers, about nine inches thick, mixed with similar layers of garden soil and quicklime, remaining so till a good heap has accumulated, when it should be turned over and mixed with it. Applied in this way, it is not so likely to breed insects, and is more efficient.

possible for cultivation, let one man walk wade, or more if it is to be made a drying ground. At the end of this main wall, an arbour may be formed of the common white clematis or Traveller's Joy (*Clematis vitis alba*), of the white jasmine (*Jasminum officinale*), or yellow winter-flowering jasmine (*Jasminum nudiflorum*); these are suitable for the purpose, being of dense growth and habit, and very cheap. On each side of the arbour flowers or herbs may be grown. On the sunny sides of the house, let a vine, apricot, peach, or nectarine be planted, seeing that a proper station is prepared for them. If there is a wall having a southern aspect, let it be devoted to some of these also; if not required for home use, they are saleable.

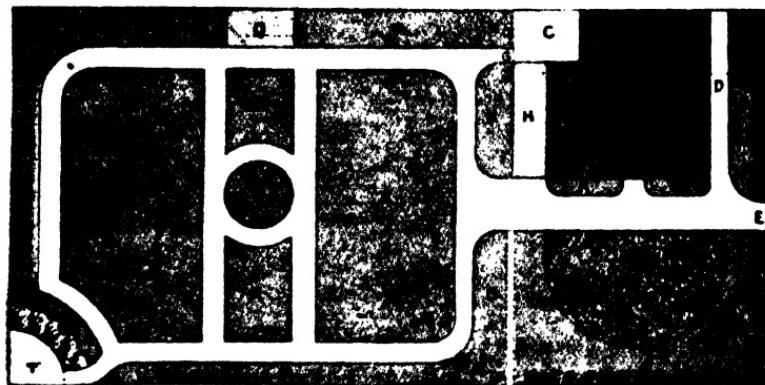
Preparation of Manures.—In the portion of ground devoted to kitchen-crops, follow out a system of rotation cropping, and use a little caution in the application of manures; which, if unprepared by time and the action of the weather, or consisting of rank smelling dung, breed no end of insects, which do injury to the crops. In preparing the manures—which, however, are essential for maintaining the fertility of the soil—let it be remembered that all animal and vegetable refuse will be useful, when properly mixed. The droppings of cattle, sheep, pigs, and all house-sewage, should be collected and saved, and mixed with garden soil; the application of a little

House and Flower Garden.—We can now apply what has been said to a small garden attached to a cottage or villa residence, and we will take as our typical garden a rectangular piece of ground, measuring about 40 yards one way and 20 the other, this being the form that generally prevails in estates parcelled out in lots as building ground. We will suppose that, as in the plan shown in the accompanying diagram, the length of the garden lies east and west, and the breadth of it north and south. By such a disposition, we are enabled to obtain a good stretch of south wall. In this, as in former plans, A indicates the house, placed at the eastern end of the ground, or, in other words, very nearly in the north east corner. In this position the house itself acts as a protection to a great

part of the garden against north-easterly winds. It is a small court, well out of the way, reached from the back of the house, and appropriated to the dustbin and offices that it is desirable to keep out of sight. A door at D—a trellised door is sufficient—gives access to a path which enters the main path near E, the entrance from the roadway. The court D is masked by creepers and shrubs, disposed along a border, F, whose frontage is devoted to flowers that will grow in the shade. A piece of trellis divides the court C from the garden, which is entered from C by the gate G. A conservatory on the west side of the house is shown at H, and beds before the conservatory and house at K, K, K. Before

the house is a broad gravel path, leading in a straight line from the entrance, E, to the main part of the garden. These and all the other paths are so distinct that no letters are required to distinguish them. Immediately in front of the house is a grass plot, L, nearly semicircular, with an ornamental tree at M. Surrounding this is a broad border, N, planted at the back with shrubs, in front of which are flowers. A dwarf wall may separate the shrubbery from the kitchen garden on the west side, and on

tinuity, is a space, Q, which may be utilised as a frame for melons or cucumbers, or as a summer house, according to taste. R is a border before the east wall, on which plums may be grown: this border may be broad, as P, or narrow, as the border, S, in front of the north wall, on which plums and morello cherries may be grown, the border being utilised as a reserve garden in miniature. The corner, T, is set apart for manure and the reception of such rubbish as will accumulate in a garden, but cannot be immedi-



this vases or flowers may be placed at intervals.

Kitchen Garden.—Thus, a third of the ground is devoted to the house and a small ornamental flower garden, and the remainder is available as a kitchen garden. The border K may be a vine border, if it is intended to grow grapes in the conservatory, H; the corresponding border, O, may be sloped as a bank, and appropriated to strawberries. Under the south wall, or wall which faces the south, on which peaches, apricots, nectarines, &c., may be grown, is a broad border, P, useful for early vegetables and the more tender crops. In the centre of this border, breaking its con-

tinuity, is a space, Q, which may be utilised as a frame for melons or cucumbers, or as a summer house, according to taste. R is a border before the east wall, on which plums may be grown: this border may be broad, as P, or narrow, as the border, S, in front of the north wall, on which plums and morello cherries may be grown, the border being utilised as a reserve garden in miniature. The corner, T, is set apart for manure and the reception of such rubbish as will accumulate in a garden, but cannot be immedi-

ately disposed of on the spot. Before it is a rockery and narrow border, U. In the centre is a circular bed, V, which may be devoted to a variety of purposes, as, for example, a rosary on a small scale, or a bed with a sundial, or even a fountain in the centre, or it may be converted into a circular basin for aquatic plants, with a fountain in the middle of it, or piece of statuary. W, X, Y, and Z are pieces of ground which may be assigned for such purposes as the owner of the garden may prefer; for instance, W and X may be planted with currants, gooseberries, raspberries, &c., and vegetables raised in Y and Z. Pyramid apple and pear trees may be placed at the corners of these

pieces, and espalier or cordon trees be trained between them. The object in forming this garden plan has been to get as much variety as possible into a limited space.

CULTIVATION AND MANAGEMENT OF COTTAGE GARDENS.

This subject naturally divides itself into two parts—the preparation of the soil, and the rotation of crops grown thereon. It is a mistake to suppose that these points, and everything that bears on them, are a matter of course patent to all, and that there is nothing to be said on them. There may, indeed, be nothing very novel to say on either of them; but there is much in each that is often lost sight of altogether, or but imperfectly understood.

Preparation of Soil.—The tools essential to the cottage gardener are the spade and the fork, the former being better calculated for working in lighter soils and the latter for heavier soils, because the action of the spade is to bring up masses of earth on its broad flat blade, while the action of the fork is to break up these masses, and to make many small lumps out of what would have been a large lump if lifted by the spade. I am speaking, of course, of soils that have a coherence and consistency, as clay soils, or soils that are apt to cake together under the influence of the sun's rays or abundant moisture. Some soils when lifted by the spade will fall to pieces

crumble nicely, and require little or no beating about to pulverise them, so to speak; but a large and heavy fork would be inefficient for lifting and turning such soil, because the tines or tangs of the fork would pass through it. Trenching is good for all soils, especially those that it is sought to bring for the first time into a condition suitable for growing garden crops. The reason for resorting to trenching is that by its means the soil is thoroughly

broken up, and brought into a state in which a greater portion of its mineral constituents can be acted on by the frost, and thus fitted by minute subdivision into atoms, and greater capability of being held in solution, to be taken up by the spongioles, or the rootlets of plants, as plant food. By ridging, or throwing the ground into a succession of ridges and trenches, as in planting leeks or celery, a larger extent of surface is exposed to the action of the frost in winter, and the air and frost is better able to find its way into and through the ridges of earth, which, consisting as they do of lumps of earth more or less broken in themselves and lightly piled together, so to speak, are more readily permeated by the atmosphere, or aerated, enabling the oxygen of the air, and its other constituents, to make fresh combinations, chemically, with the mineral atoms with which it comes in contact. In this lies the philosophy of digging, trenching, and ridging; and it is obvious that this should be done from November to January inclusive, when Nature is dormant. By this it is not meant to say that ground is not meant to be dug over at any other time of the year. To grow good crops of certain vegetables it is necessary to turn the ground over at least a month before they are put in, and thus render it lighter and looser for the reception either of the seed or of growing plants.

THE KITCHEN GARDEN.

Form.—No better form can be devised for a kitchen garden than a square, subdivided by two centre walks, as in Fig. 1, or a long parallelogram, as Fig. 2. Something like Fig. 3 has also been recommended by Mr. Loudon and others, and the rounded part would make a beautiful fruit garden. This figure might also be rounded at both ends. The centre walk should pass through close at each end.

a represents the wall ; *b*, fruit-tree border, 10 feet wide ; *c*, walk, 6 feet wide ; and border for dwarf trees or bushes, or the culture of strawberries, &c., 6 feet wide.

Borders.—Whatever shape is adopted,

level, it may often be desirable to give fruit-tree borders a considerable inclination, to get the benefit of the sun's rays and insure thorough drainage. Borders against the wall may be sloped in directions opposite to those which line the inner side of the walk. These borders have also a good effect laid on in round ridges.

Sloping Banks or Ridges.—In level kitchen gardens it is often desirable to throw up sloping banks or zigzag ridges for early and late crops. The south front of such banks, especially if a thatched hurdle or some other check to the wind is placed on the top, is equal to a south border ; and the north side is equally useful for late strawberries, salading in hot weather, &c. Such banks are also most useful for training peas, &c., on table-trestles, within 1 foot or 18 inches of the surface. Some of the borders at the side of the walk might also be occupied by iron wire for training trees or espaliers, table-trestles, &c. One should be devoted to raspberries, planted 3 feet from the walks, and trained to a handrail at the side of the walk, from 3 to 4 feet high. The advantages of this system, on the ground of beauty, doing justice to the young wood, and the facility and pleasure of gathering, must be at once apparent.

Soil and size.—The size of the kitchen garden must depend upon the demands upon it, and the mode of culture adopted.

borders should always be introduced on each side of the main walks. Nothing tends more to relieve the heavy appearance of large masses of vegetables, and to confer an air of elegance to a kitchen garden, than such borders. They should be separated from the main vegetable compartments by small walks, from 18 inches to 2 feet wide. These walks can be edged with pebbles, and have a sprinkling of gravel, or simply cut off as alleys, and be left solid earth, at pleasure. If they are formed of some hard substance, all the wheeling can be performed on them instead of on the main walk.

Inclination or Slope.—Perhaps the nearer to a level a kitchen garden can be formed, the better. A slight inclination to the south-east, or west, might be an advantage ; on no account should it incline to the north. Where a kitchen garden is nearly be

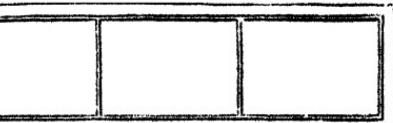


FIG. 2.—OMB LONG KITCHEN GARDEN.

It is bad policy to have it too large. It should be kept in the highest state of cultivation, and its productive powers stimulated to the utmost by liberal dressings of manure. The soil should be

SOIL AND SIZE OF GARDENS.

trenched at least 4 feet deep, and drained 1 foot deeper. All the coarse vegetables, such as Jerusalem and globe artichokes, horseradish, rhubarb, &c., should be grown outside the walls, if possible, in a slip by themselves. Herbs should have a border devoted to them, and be grown in beds 3 feet wide. Thus cultivated, the back garden becomes a source of interest and an object of beauty, and they are easily accessible. All that has been here advised is as applicable to a plot a few

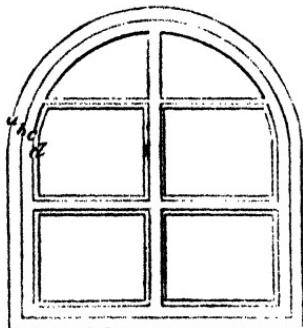


FIG. 3.—KITCHEN GARDEN ROUNDED AT ONE END.

yards square as to a nobleman's garden of ten or twenty acres. There is no reason why the kitchen garden should not bear the impress of order, design, and high keeping, as much as any other part of the grounds, or why this should in any way interfere with securing the largest amount of produce of the best quality from a given space, which should be the leading object in this department.

In disposing of the main body of the garden, if the form be such as will admit of doing so, as shown in Fig. 3, divide it into four equal compartments, by means of cross-walks, 3 or 4 feet wide, as already recommended. If it be desired to have standard fruit-trees, plant a row through the centre of each quarter from north to south, and no more, for it

be remembered that the more trees there are, the less and poorer will be the crops, both of fruit and vegetables. As regards gooseberries, black, red, and white currants and raspberries, it is far better to plant one of the quarters with these instead of resorting to the very common practice of bordering the quarters with them. This is done on a false notion of economy, while, in fact, it is a great waste; it is also done with the view of being ornamental—it is in reality the contrary; and it involves the loss of these bushes as renewers and preparers of the soil for ordinary kitchen crops in connection with a system of rotation of crops which will keep the ground in good heart without any intermission of the produce. The converse of this may often be seen in old kitchen gardens which do not return the worth of the seed sown in them, where the soil is swarming with grubs, maggots, and mildew; where cabbages club and rot, tap roots canker, and potatoes produce no tubers;—and why? Because the soil has been for many years over-tasked, cropped highly, and injudiciously manured, whereas a proper system of rotation cropping would have kept the ground in good heart. See *Cottage Gardens, Rotation of Crops in.*

There are certain permanent crops, both of vegetables and fruit-trees, which will occupy the gardener in the autumn months. To begin with the borders: In preparing them dig out the soil to the depth of 4 feet, and in the bottom of the trench thus formed place first about a foot in thickness of brick rubbish, or any coarse stuff, which, when rammed down hard, will prevent the wall trees from forming tap roots.

If the soil in the kitchen garden is naturally good loam, no more is required than to mix a quantity of well-rotted dung with it before throwing it back into the trench, making the borders slope gradually towards the paths. If the soil requires improving,

get a quantity of friable loam, mix rotten dung with it in the proportion of one part dung to three parts loam, and mix this again with the soil of the border where the trees are to stand. Plant the border with healthy young trees—peach, nectarine, and apricot, and, if desirable, with grape vines and figs: these ought to be placed 12 or 15 feet apart. The following is a very convenient plan of growing grapes on a wall between the peaches. The latter were placed 15 feet apart, and a vine planted in each space half-way between; the vine was carried in a single stem to the top of the wall, where it divided into two stems, which were trained right and left under the coping; and as they were pruned on the spur system, they took up little room, and did not interfere with the other trees. On the east and west walls plant trained trees—plums, cherries, pears, and mulberries—after the same rule, but without the same precaution as to soil, as these are not so particular.

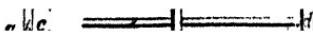
In draining the kitchen garden, one of the drains ought to run the whole length of the south border; for where peaches, nectarines, and especially apricots, are to be cultivated, the ground should be thoroughly drained.

DISPOSITION OF CROPS.

To know how a garden, or a piece of ground devoted to gardening purposes, may be apportioned and suitably cropped is of the utmost importance. The quantity of ground under consideration here is an acre, but smaller plots of ground may be treated in like manner, due regard being had to the proportions of the different parts into which they are divided.

Suppose the accompanying diagram to represent an acre of ground, the length to run east and west, which gives the advantage of a good peach wall at *a*. The line beyond which it is not advisable to crop is

shown by *b*. A border 12 feet wide, which may be devoted to early crops, or espaliers, pillar, or bush fruits, is denoted by *c*. The same may be said of the borders *f* and *g*. The east and west walls may be devoted to trained plums, cherries, and pears; *i* is supposed to be a low wall, fence, or hedge; *h*, a border, where late fruits or salading may be grown during the summer-time, when a little shade is an advantage to



DISPOSITION OF CROPS IN KITCHEN GARDEN.

them; *d* is the main walk, 6 feet wide, running round the quarters; *e*, cross-walks, 4 feet wide between them. The main body of the kitchen garden is divided into eight squares, two of which are devoted to each group of plants, namely, Deepeners, Exhausters, Surface Crops, and Preparers. Let *b* be planted with (1) asparagus, (2) globe artichokes, (3) seakale, and (4) rhubarb. Of course, the space for each will be determined by the requirements of the

family ; but the proportions indicated may serve as a guide. Let 5 be planted with bush fruits, as currants—including red, white, and black—gooseberries, and raspberries, and, it may be, root-pruned trees. Horseradish may be planted between these. To keep all these in proper condition, a few of each should be removed every year ; the asparagus, seakale, and rhubarb for forcing ; the artichokes can be separated for propagation ; and the raspberries divided and replanted. The parts numbered 7 and 8 are supposed to be planted with *preparers*, which comprise beet, celery, carrots, turnips, leeks, onions, peas, scorzoneras, salsaify, beans, cardoons, Jerusalem artichokes, potatoes, parsnips, scarlet runners ; these are some of the principal kitchen crops, and comprise about one-fourth. Then, again, let 1 and 2 be devoted to *surface crops*, which, for the sake of equalising them with the other groups, will comprise numerous light crops, as salads, sweet herbs, &c. similar crops ; the *exhausters*, comprising another fourth of the whole—broccoli, cabbage, Savoys, Brussels sprouts, cauliflower, kale, or bok-cole. These will occupy 3 and 4. As these two squares become vacated, the *deepeners* may fill the space left by them, until, in course of time, 3 and 4 become filled with the latter. The *exhausters* will have taken the place of the *surface crops* on 1 and 2 ; the latter will be transferred to 7 and 8, previously occupied with *preparers*, which have followed the *deepeners* on 5 and 6 ; and thus a perpetual rotation may be maintained, which will improve the ground instead of impoverishing it.

MIXED GARDENS.

There are thousands of good old English gardens where it would not only be contrary to the genius of the place, but practically impossible, to separate altogether the kitchen and flower garden. Most gardens

attached to farmsteads, and many vicarage gardens, fall under this category. But there are many others of greater pretensions, where it would be a great mistake to leave what is called the kitchen garden entirely devoid of floral ornaments. Without at all interfering with the proper and profitable culture of vegetables and fruits, the kitchen garden, with a little taste and far less labour, may be made extremely ornamental. Let the walks that need it be kept well gravelled ; and as box-edging is always getting out of order in a kitchen garden, substitute for this a thin tile, one foot long and one inch thick, and about six inches deep, scalloped at the top, which may be purchased in various patterns ; or a row of fine bricks, laid at an angle, makes a good edging. These, which are very inexpensive, and last a long while, should be inserted half their depth in the soil, and form a very useful and ornamental division between the walk and the border : a small movable wooden step should be used whenever it is necessary for the barrow to pass over them. A broad grass-walk, also, down the centre, or elsewhere in the kitchen garden, may be made to contribute much to the beauty of it, by having rows of well-trained pyramidal pear-trees planted on each side, with standard rose-trees in the intervals between the pears, and in a line about two feet nearer than they are to the centre of the walk ; wire arches, with roses over them, may in different places be thrown across the gravel walks without at all interfering with the general purpose of the garden, and with a very pleasing effect. Crocuses, narcissi, and daffodils near the edging tiles will make the walks gay in the spring. The piers of the walls also, without at all interfering with the fruit-trees, may have many pretty flowering shrubs, &c., trained up them, such as the *easter Simonsi*, a plant of slow growth which completely hides the wall.

BORDERS.

Formation and Planting.—Borders in flower-gardens differ from beds, in having a walk only on one side of them. They require much care, and the exercise of good taste in planting. Height, colour, and time of flowering are the main qualities to be regarded. The object ought to be to have an equal number of plants in flower in each of the floral months, and colours in agreeable contrast. Hardy herbaceous plants alone may keep a border perpetually gay, but they must be arranged with regard to height and colour—pansies, daisies, primroses, silenes, &c., being dwarf; pinks, cloves, carnations, veronicas, &c., taller; phloxes, various sorts of campanulas, chrysanthemums, &c., and star-worts, Rudbeckias, &c., being tallest of all. Plants of this class flower at various times of the year, from early spring to late in the autumn. Where spring-flowering bulbs are mixed up with them, it is not advisable to plant them near the edge, as is often practised. Plant them far back; as they flower when the borders are comparatively bare, they are sure to be seen to advantage; and the long grassy leaves do not disfigure the borders after they have flowered, as they do in the old method. Late bulbs, as gladioli and lilies, being tall, should be placed far enough back to correspond with the other plants.

North Borders.—North borders in gardens are generally much undervalued. In the flower garden a wall facing north, if it happens to exist, is frequently looked upon as a nuisance, and covered with ivy; in the kitchen garden it is only more profitably occupied by Morello cherries and red currants, while, in both cases, the border is kept as shallow as possible, and turned to little or no account. Many plants and shrubs, however, will flourish upon a north border and against a north wall, and show

themselves hardy there, which in any other situation would not outlive a winter's frost. In the flower garden let the north wall have a good deep border of bog, and against the wall all the hardy sorts of camellias will flourish and blossom freely. The green and the black tea-plant also, not having their bark exposed to the scorching sun of summer, will survive our severest winters in such a situation. Rhododendrons will also do well, and so will chrysanthemums. All our hardy indigenous ferns do better upon a north border than under any other aspect. Those persons who wish to acclimatise any tender plants should, by all means, make their first experiments upon a north border or against a wall facing north. This is decidedly the best position for all cuttings during spring and summer, to enable them to stand the severity of winter.

EDGING FOR BEDS AND BORDERS.

Sometimes gardens are laid down on a mixed plan of grass and gravel. When each bed is edged with brick, stone, tile, or cement, these edgings are occasionally surrounded with from 2 to 4 feet of gravel, succeeded by the same or a greater width of turf. Beds on grass, however, unless much elevated above the surface, are most effective without any edgings whatever; although, in certain situations, raised beds, with massive edgings of stone or rustic-work, look well. For beds on gravel, an edging of some kind becomes imperative. Of all living edgings box is the best; thrist, sedums, and saxifrages of various kinds, especially *Saxifraga hypnoides*, follow each other in value and adaptability for this purpose. There is, however, one thing against all edgings of this description, and that is, that they afford a harbour for slugs, snails, &c. Ornamental stone, tile, brick, or cast-iron edgings, are probably better than any living edging whatever.

PLANTING BOX EDGING.

These can neither afford a lodgment for insects, exhaust the soil, nor look patchy through dying off; and although perhaps more expensive in the first instance, the first expense is the only one. They can be purchased on very reasonable terms, and of varied and elegant designs. Whatever edgings are used, they must vary in height and thickness with the size of the beds they define. Nothing can be in worse taste than a heavy massive edging surrounding a small delicate pattern, or *vice versa*:

Ornamental wirework often makes a very effective edging for different beds. A useful edging is sometimes made of thin boarding, say about $\frac{1}{2}$ inch in thickness, and from 3 to $4\frac{1}{2}$ inches wide. Bricks, set with one corner upwards, and laid one on the other,



METHOD OF PLANTING BOX EDGING.

along the edge of the border, make a strong and useful edging, and the same may be said of stakes, disposed in an X form or threaded on wires in an upright position, every alternate length being 1 inch shorter than those on either side of it. In the last-named form of edging a long stake should be threaded on at intervals of from 3 to 6 feet to keep the edging in place. This kind of edging adapts itself with great facility to beds with curved outlines.

HOW TO PLANT BOX EDGING.

The method adopted in planting box edging is simple enough, but it should be carried out in strict accordance with the directions about to be given in order to ensure regularity of setting and evenness of growth. The mode of procedure is shown in the accompanying sectional illustration, and it is scarcely necessary to say that it is precisely the same both in

planting a box edging for the first time and in renovating, or rather replanting, an old edging. The old plants having been pulled to pieces, and prepared for planting, if the path be already gravelled, the gravel must be drawn back from the edge of the border towards the middle of the path, as at A. The edge, B, of the border must then be dug over with a fork, and the soil along the edge be brought to a level and even surface, and rendered firm and solid by beating it with the spade. A garden line is then stretched along the edge of the border, from end to end, as at C, so as to clearly define the edge and show the exact line that is to be occupied by the box. A shallow trench, E, about 3 inches deep, is then made with the spade, and the earth is drawn out on the path, as shown at F. The edge of the bed then assumes the form shown at BCD, and the side of the edge, CD, is rendered as firm and solid as the surface, BC, by beating and flattening it with the spade. It will be noticed that the side of the edge, CD, is in a direction slanting outwards. This is done in order that the roots of the box may strike outwards into the gravel, and thus be kept from too luxuriant growth. The pieces of box are then placed along the slope, CD, as shown in the illustration; the soil at F is returned to the trench, E, and trodden in firmly against the box, and, lastly, the gravel at A is restored to its original position. It must be understood that the soil at F is not earth only, but earth mixed with a large proportion of gravel. When work is done, the freshly planted box should be from 1 inch to $1\frac{1}{2}$ inch above the surface of the gravel on one side and the surface of the border on the other. After the gravel has been put in its place, the plants should be well watered.

FENCES FOR GARDEN GROUND.

Fences for flower-gardens and shrub-

berries may be constructed of various materials and of many different patterns. It is more suitable for summer houses, window boxes, &c., than for fencing.

At one time rustic fences were much used for separating the park from the

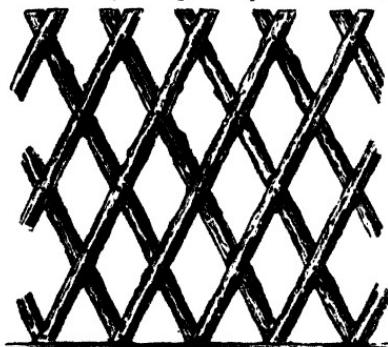


FIG. 1.—DWARF FENCE IN RUSTIC TRELLIS WORK.

pleasure ground. While they are among the most beautiful, they are certainly the most expensive of all fences. They may still be used to separate one part of the grounds from another — the rabbit-proof garden from the outside pleasure ground — where labour and expense are no object. The designs given in Figs. 1 and 2 are simple, but pretty, and they can be made of hazel, larch, spruce, and indeed any young trees. The bark should always be left on, and the more numerous and rougher the knots, the more rustic the fence will be. Fig. 1 represents a fence in rustic trellis-work. The bars of which it is formed should be slightly notched one into another at the points in which they cross, so that they may have a better bearing one against another and a firmer holding than round sticks could possibly have if nailed together without notching. For the rustic mosaic work shown in Fig. 2, sticks of hazel, maple, willow, cherry, &c., must be sawn in sunder lengthways, and then cut into pieces as required to form the mosaic. These pieces must be

GATES.

For single gates across a carriage road, across a pathway, or anywhere else, those shown in Figs. 1 and 2, being of an ornamental character, will be found appropriate. The number of bars and patterns of such gates can be made to suit every purpose and gratify every taste. On carriage roads, gates should never be less than four, and seldom need be more than 6 feet in height, 5 feet being an excellent average. The construction of these gates cannot be described at length here, but the principles involved are explained by the sketches themselves, from which any carpenter of average intelligence, or any amateur who can use a saw, plane, hammer, and chisel, might easily make them. Gates may be of wood or iron as preferred. As a general

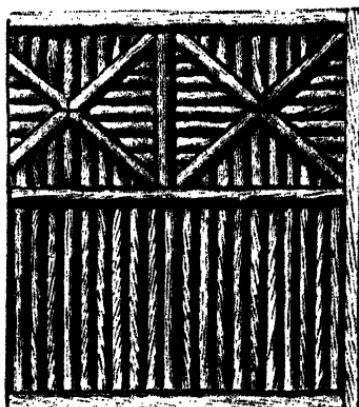


FIG. 2.—DWARF FENCE IN RUSTIC MOSAIC WORK.

rule, they should always be in harmony with the character of the fence.

HEDGES.

Hedges, if properly managed, undoubt-

edly constitute the cheapest and most lasting, as well as the most ornamental, of all the artificial divisions of land. Few persons will object to the opinion, that the country

evergreens, can be raised at almost as small an expense as thorns. Upon every large estate the woodman should have his seed-bed of hollies, evergreen oaks, and other things that can be used for hedge purposes.

Holly.—Few things have a better appearance than a well-kept holly hedge. The best variety for the purpose is *Ilex Aquifolium*, the Common Holly. In forming a holly hedge, the ground should be prepared by trenching, and, if

where fields are divided by the common white thorn or may, presents a far more agreeable appearance at all seasons of the year, and especially during spring, when the thorns are in blossom, than those parts where dwarf stone walls are made to answer the same purpose. The White Thorn, however, though most commonly employed, is not the only plant that can be made use of for separating one piece of ground from another. Though for fields it is, perhaps, as useful as any, still, for park and garden purposes, there are many other plants which may be advantageously employed.

Thorns.—The different kinds of thorn certainly embrace all the constituents of a good hedge: they are of easy culture, quick growth, and capable of being trained in any direction; they branch out and thicken under pruning, and are not over particular as to soil; but there are many other plants far more ornamental which will fulfil all these conditions equally well. For some time the chief objection to the general introduction of most of these was the cost, but this is an objection that is rapidly being got rid of, for hollies, and several other

the soil be poor and sandy, it will be well to let it have a dressing of manure. The best plants are those of three years' growth, which have had one shift from the seed-bed. They should be taken up carefully with as much soil on the roots as possible, and planted soon after

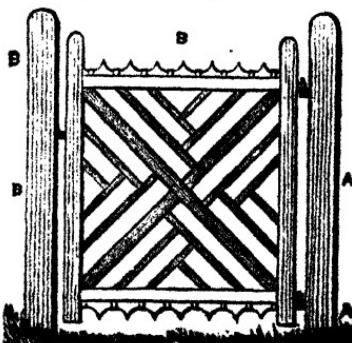


FIG. 14.

midsummer, if possible, during the rains of July. A broad trench should be dug, capable of receiving the plants, which should be placed in it singly, with their

roots well spread out. If the weather be dry at the time, the best plan is to water the bottom of the trench and to give no water afterward, unless a severe drought should set in. The next season, if they be well rooted, the young plants may be moderately pruned with the knife, after which they will branch out and form themselves into a good hedge.

Yew.—Next to holly for forming a compact and durable hedge is the yew. It bears close clipping, takes up but little space, and is a good shelter throughout the year. The yew, however, must only be used for garden purposes, or, at any rate, in places where cattle can be kept from it, for horses and all cattle are very fond of the yew, and will eat greedily the young spring leaves, though they are very injurious, and often fatal to them.

Box and Privet.—The same objection attaches to two other plants, which make very useful and ornamental hedges—the box and the privet. Both these should be kept out of the way of cattle. In gardens and pleasure-grounds they may be used with very good effect, for they bear clipping almost better than anything else, and are very neat and compact. The privet mixes well with the thorn, where greater strength is required than can be had by using privet alone.

Clipping Hedges, &c.—All evergreens and hedges, especially evergreen hedges, should be cut to a point pyramidically; for if the top be allowed to overhang the bottom, the lower shoots will invariably die off. With hollies and laurels use the knife in pruning, to avoid the rusty appearance of the withering of half-cut leaves. Privet and thorn may be clipped with the garden shears.

General Treatment of Evergreens.—Few things afford stronger indications of the necessity of renovation and reform in a garden than the state of the evergreens

and hedges. These are so easily and so insensibly suffered to grow wild, and are so seriously injured by want of care and the proper use of the knife, that neglect cannot go on very long without its ill consequences becoming manifest. Portugal laurels and many other evergreens may be cut in; but with the common laurel it is a saving of time to cut it down at once; so also with the arbutus and sweet bay. Privet, and holly hedges, which from years of neglect are found to be occupying too much space, must be cut in. The former may often be cut down with advantage to within a few inches of the ground, and the latter cut close on all sides to the single stems. In a few years new and fresh wood will fill up all vacant spaces, provided the soil is enriched and kept free from weeds.

CONSTRUCTION OF GARDEN WALLS.

Materials.—Materials used for garden walls will always depend upon local circumstances; brick, stone, clay, chalk, and oak fencing, being all in common use. Of all these materials, brick seems to be the favourite, absorbing most heat, being the best for training and the most enduring. Forsyth says, “Where brick cannot be had, it is better to dispense with walls altogether and adopt wood.”

Cheap Wall.—An economical wall is sometimes constructed of bricks laid as stretchers on each side, as shown in section in Fig. 1, the space between being filled up with concrete similar to that prepared for the foundation, which in all cases is best made of concrete. This concrete adheres to the brickwork. Headers, or bricks across, are used occasionally as bonds, to hold the two sides together. A solid wall of $13\frac{1}{2}$ inches, or even 18 inches, if built in this manner, would require, roughly speaking, the former only two-thirds of the quantity of bricks employed in building a solid wall.

of brick, and the latter not more than one half, while the cost of the concrete is comparatively trifling. In countries where brick is not easily obtained, a very good wall may be constructed with a brick in front, and stone behind, where one front only is required for use. In Fig. 1 a section of a wall 18 inches, or two bricks thick, is shown, faced on each side with brick, and filled with concrete, and in Fig. 2 an end of the same wall.

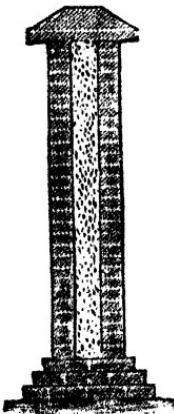


FIG. 1.—WALL FILLED
WITH CONCRETE.

18 INCH WALL.

Stone walls for gardens should be built in courses of 4 or 8 inches thick : the stones hammer-dressed on the external surface, the mortar bed not too thick, and the joints pointed and drawn clean. In stone walls—perhaps in brick walls also—copper or iron nails with eyes should be let into the interstices of the wall, to tie down the branches of the fruit-trees, taking care that they are let in with the eye close to the wall ; for the radiation of heat from the wall is in proportion to its distance, and the heat which is 1° a foot off the wall, is 144° when in contact with it. The advantage of the eyed nails consists in preserving the wall.

Thread dipped in pyroligneous acid, or flexible wire, may be used for the purpose.

The chief difficulty in the use of eyes in a stone or brick wall arises when they happen to have been driven in at equal intervals horizontally and vertically after the wall is built and before the trees are *in situ* or ready for training. It is better to insert the eyes when engaged in training trees, as then the eyes may be put in exactly where they are wanted. It is better to strain wires along walls, pulling them as close to the surface as possible, for the reasons given, then to tie down the branches to eyes.

Besides brick and stone, chalk, clay, and earth mixed with straw to make it bind, have been sometimes employed in erecting garden walls successfully. In each instance the process is pretty nearly the same. A foundation being obtained, a wooden frame is prepared and laid down on each side, of the exact thickness of the intended walls. Into this frame chalk, of clay, or earth mixed with straw, previously worked into a thick paste, is thrown in layers about 6 inches thick all round. The layer thus placed is made level by raking, and rammed down hard with a rammer. It is then left to settle and consolidate before the next layer is put on. In this way the work proceeds layer by layer, until the intended height is attained, when a coping of stone or other material is bedded on it with cement or mortar.

Best Heights for Garden Walls.—For small gardens 8 feet walls are most suitable, provided the trees on them are planted so far apart as to admit of their horizontal extension. For gardens of larger size, 10 feet walls, and for an extensive garden 12, and even 14 feet, will not be too great. In gardens of great extent—enclosures of four for instance—the walls may be higher, but in no instances more than 18

high for the north wall, 15 feet for the east and west walls, and 12 feet for the south wall.

GARDEN PATHS AND WALKS.

As garden walks are necessary parts of every garden, whether large or small, it is necessary here to give, as exhaustively as space will permit, a description of the different methods that are employed in their formation.

Substratum.—The chief thing to be done in every case is to provide a solid but yet porous substratum, which will afford sufficient support to the materials of which the upper part of the walk, or rather its surface, is made, and yet allow of the rapid passing away of the water that may fall on the walk in the form of rain. Of course, we are now supposing that the walk is made in the ordinary way, and coated with gravel, which is used for walks and paths in the same manner that “metalling,” as broken stones are technically called, is used for broader roadways, especially those of a public character. The course of the path or walk must first be marked out with stakes, and the surface soil removed, as in roadmaking, to the depth of from 12 inches to 18 inches, if there be no lack of material to fill up the trench thus made. From one-third to one-half the depth must then be filled up with rough stones, brick-bats, clinkers from the brick fields, slag and scoriae from the iron works, and any coarse, hard rubbish that can be gathered together.

Surface.—The greater part of the remainder of the trench must then be filled up with coarse gravel, shingle, &c., which may be mixed with a little earth, to give consistency to the whole, and finally coated with good gravel to the depth of 2 or 3 inches. This superficial layer

be constantly rolled with a heavy

garden roller until the path is hard and solid. The section of a garden walk made in this manner is shown in the illustration, in which A is the stratum of brickbats, &c., B the layer of gravel or shingle, intermediate in size between the brickbats below and the gravel, C, above. The top of the gravel, and, indeed, of every walk, should be gently rounded in order to allow any rain that may fall to trickle off on either side, whence it soaks away into the earth at E, E.

Grass Walks.—Occasionally it is necessary, in cases where a piece of garden ground is acquired at some little distance from the house, either for temporary purposes, or as a means of extending the garden accommodation at the house itself, which in the outskirts of many towns is



FIG. 1.—SECTION OF GARDEN WALK.

but limited, to form the garden paths of turf, which is cleanly in itself, and sufficient for all practical purposes when the garden is not a daily resort. If the land is grass land, then nothing more need be done than to mark out the beds and plots to be devoted to the growing of fruit and vegetables, and to turn and trench these parts, leaving the tuft between them to form the paths. It can easily be kept short with a mowing machine, and by constant cutting will become a close and verdant carpet. If the garden be on arable land, as the cost of turf is no more than 3d. per square yard, it will be as well, if the season of the year be favourable, to mark out the paths and proceed at once to lay them down with turf. Many pieces of land to be let or sold for building purposes are previously utilised as gardeins, and by having paths of turf there is less

loss if the land has to be given up on short notice.

GRAVEL WALKS.

Management of Walks.—Few things are more essential to a good garden than well-kept gravel walks. Leaves and all extraneous matter may be cleared away by frequent sweeping. Weeds also may be removed by hand hoeing; care at the same time must be taken that the surface of the walk is hard and level, and for this constant rolling is desirable. When necessary, the colour may be refreshed by turning, and by the addition of a little fresh gravel; salt-and-water carefully used for destroying weeds will at the same time much improve the appearance of the gravel.

LAWNS.

During spring, and the early summer months, all garden turf and lawns will require very great attention. If they are to look well for the rest of the year (and we must remember that the general appearance of the whole garden depends much upon the state of the turf), it is at such times that the broom and the roll must be kept in constant use. If the grass, from the nature of the soil, is inclined to grow rank and coarse, it will be much improved by a good dressing of sand all over it; if, on the other hand, it has a tendency to scald and burn up, it will receive great benefit from a sprinkling of good guano or soot just before a shower of rain. Before regular mowing commences, it will be well to go over all grass, carefully removing rank and unsightly weeds, daisies, dandelions, the little buttercup, &c., &c. Wherever the turf is mossy, it is a very good plan to rake it well with a sharp five-toothed rake; but it must be borne in mind that under-draining is the only effectual cure for moss. Daisies should never be allowed to flower; a good

daisy rake, with a little trouble, will remove all flowers as they come out; but the only plan to clear a lawn effectually of these disagreeable weeds is to take them out with the *daisy fork* wherever they are found. Daisies, and all weeds, are more easily removed in wet weather, or after a shower, than when the ground is dry. The tool may be used by any lady or child; and in process of time the most hopeless pieces of grass may be cleared by it. Turf, quite white with daisies in the spring, may be cleared entirely in the course of a season.



PERSPECTIVE VIEW OF SUMMER-HOUSE.

The neat appearance of the garden will well repay the time and trouble spent in the continual use of the daisy fork. A few showers of rain and a heavy roll will soon obliterate the holes that are made; and fine grass will not be long in filling up the spaces hitherto occupied by daisies and weeds.

The appearance of a garden depends greatly on the quality of the turf and the way in which it is kept. Close cutting and continual rolling is the secret of good turf. On good soil little else is requisite; but on

poor, sandy soil the verdure must be maintained by occasional waterings with liquid manure and a dressing with guano or soot, if the lawn be not so near the house as to render such applications objectionable.

SUMMER-HOUSES AND SEATS.

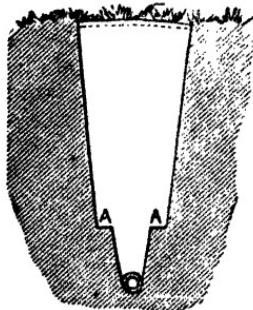
Summer-houses and seats are very desirable, in pleasure grounds and gardens. Almost any clever carpenter can put up a rustic arbour—at any rate, with the assistance of a few hints. Arbours, however, as well as seats, can be bought ready

made. Very neat buildings may be formed with young oak stands, ornamented with pieces of oak billet and thatched with reed; also of Scotch fir poles split or sawn in two lengthways, showing the bark on the outside. Such summer-houses as these may be boarded inside and lined with matting, or made more ornamental by a paneling of split hazel worked into different patterns. The flooring can be of brick or stone. More substantial houses can be built wholly of flint or stone, and fitted up accordingly.

Let us now proceed to a consideration of some of the processes resorted to in working garden ground. A few only of these need be brought under the notice of the reader, and even these must be restricted to a description of those processes on which instruction is mostly required and an explanation of those terms which are frequently used in describing operations carried out in gardening but, perhaps, not generally understood.

DRAINING.

Object and Mode of Draining.—However high and apparently dry a situa-



SECTION OF DRAIN.

tion may appear, it is quite possible that it requires to be drained. The object of draining is not only to get rid of superfluous moisture, but also to prevent the little there may be from remaining stag-

nant. It is quite a common occurrence to find a piece of ground that is never too wet, but which is, nevertheless, sour and unfitted for the cultivation of delicate flowers. It should, therefore, be the first care of the florist to make drains from the highest part of the ground to the lowest, three feet from the surface, dug in a V shape, as shown in the accompanying diagram; and if there be no outlet at the lowest part, to dig a hole, or well, or pond, into which all these should lead, even when there is no apparent means of getting rid of the water. At the bottom of these drains, along the narrowest part below the shoulders A A, a row of common 2-inch earthen pipes may be placed, end to end, and covered up again with the soil. These are too deep to cause any danger of disturbance in ordinary operations; and the effect is to let air into the soil, if there be no surplus moisture; and to prevent the lodgment of water anywhere, a distance of

DIGGING AND TRENCHING.

about a rod apart, in parallel lines, will be sufficiently close for the drains, and a larger drain along the bottom, or a ditch, may lead at once to the outlet or the receptacle for the water. Suppose, however, the soil is really surcharged with water, and there is no place but the pond made for the purpose into which this water can pass, and suppose, while we are imagining evils, that this pond or hole fills higher than the bottoms of the drains, it is obvious, in such cases, that the drains cannot empty themselves. Still, even such drains are of use; if they can only discharge all the water in the driest season, immense good is done by them. If the pond be not too large, a garden-engine may be set to work to lower the water by throwing it over the surface; and although it may fill as fast as the water is taken away, there is a circulation of water going on in the soil, instead of moisture being stagnant, and the ground made sour.

Materials.—Materials used for drains are very varied; brushwood, rubble, stones, bricks, and pipes being all in use. In clay countries it is no unusual thing to form pipes with the clay itself, by inserting an arched framework of wood, and withdrawing it when consolidated. The best and cheapest drains, however, are drain-pipes, which are now obtainable everywhere on moderate terms.

DIGGING.

This is done with the spade or fork, the latter implement being far more effectual and easier to use in breaking up and loosening stiff soil. In digging with the fork, however, little can be done beyond breaking and turning over the ground and reducing the clods thus turned up. In digging with the spade, the soil can be transferred more readily from one position to another. In digging over a piece of ground the first thing to be done is to

take out a trench about a spade deep and a spade wide, or, in other words, about 12 inches in depth and the same in width. The soil from this trench should be removed to the other end of the ground to be dug over for a purpose which will be seen presently. Another trench of the same size is now taken out, and the soil is transferred into the first trench and then broken up by cutting and beating with the spade. This process is carried on until the whole ground has been dug over and the last trench taken out is filled with the soil taken from the first trench. In digging, all roots, bind, &c., should be carefully picked out, and the clods thoroughly broken up. In manuring during digging, the manure should be thrown with the fork along the bottom of the trench, and the earth from the next trench thrown on top of it. This is simple digging to a spade deep. A more complex system is described in *Trenching*, which immediately follows.

TRENCHING.

Next in importance to the subject of drainage is the introduction into the soil of atmospheric air, which is a combination of oxygen and nitrogen—one of the objects of drainage being to admit oxygen, with the other constituents of atmospheric air, into the soil. We are now brought on to a consideration of digging as the third and best known, because most frequently practised, of the three great mechanical means by which natural soils are prepared and brought into cultivation. The admission of atmospheric air, which is promoted in the first place by draining, is facilitated by the deep trenching which usually follows the thorough drainage of a garden ground. The immediate object of trenching is to deepen the soil, and prepare the subsoil to nourish the fibres of deep-rooting plants. The operation is commenced by throwing

out the top spit to a convenient breadth for the workman, and wheeling it to the farther end of the bed or quarter; the second spit is treated in the same manner if the trenching is to be three spades deep. This done, the bottom of the trench is dug up as roughly as possible, so that it is left level. The top spit of a second portion of the ground is now removed and placed alongside the first, and the second spit of this portion is dug up and placed roughly over the first trench. The first spit of a

TOP SPIT TO H. SECOND SPIT TO K

TOP SPIT TO L

SECOND SPIT FROM A.

TOP SPIT FROM A.

TOP SPIT FROM B.

. 1.—PLAN OF GROUND MARKED FOR
TRENCHING.

third portion is now removed and placed in as large masses as possible over the first trench: the bottom of the second trench is now dug up in the same manner as the first, and so on till the whole is finished.

How Done.—To render the operation of trenching three spades deep fully intelligible, it may be as well to make the description that has just been given yet more clear by reference to a diagram. Thus, in Fig. 1, a plan of the ground to be trenched is shown divided into trenches, A, B, C &c., of convenient width, say 12

inches; and in Fig 2 a longitudinal section of the ground, showing it divided into layers 8 inches in depth, and into trenches 12 inches wide, so that the trenching is carried to the depth of 2 feet. The operation of trenching is commenced by taking out the top spit from the trench A and wheeling the soil to the other end of the piece of land to be trenched, placing it at H in a long row, the length of the row being equal to the width of the land to be trenched, and at a sufficient distance from the space to be occupied by the last trench to allow the second spit from A to be placed at K, alongside of the mould at H, and nearer the last trench, G, than the mould at H. The top spit from the second trench, B, is then to be wheeled to L. The disposition of the first and second spits from A and the top spit from B is thus made to bring the mould into a convenient position for filling in the trenches F and G at the completion of the trenching; for as the second spit in G is thrown into F to form the second spit of that trench, the top spits from A and B are thrown into F and G to form the top spits of those trenches. It will manifestly be easier to throw the mould of the second spit from A into G from K than if it had been placed to the rear of the top spits from A and B, and when this mould has been put in its place the mould of the top spits from A and B may be thrown over the second spits in F and G just as the mould comes to hand. In the sectional view in Fig 2, the transfer of the spits of earth from trench to trench is shown by the arrows. No further mention need be made of the temporary removal of the first and second spits in A and the top spit in B to the rear of the ground to be trenched. In the diagram, the third spits are distinguished by crossed irregular lines. This spit in each trench is broken up into rough lumps when the spits above it have been removed. The second

BLANCHING—MULCHING.

spits are shown by diagonal lines, and the transfer of the spits from B to A, from C to H, &c., is shown by the short arrows. The top spits are shown by dotted spaces, and the transfer of the spits from C to A, from D to B, &c., is shown by longer arrows. When the second spit in H has been removed to a similar position in G, and the top spits in G and H to similar positions in E and F respectively, the vacant spits which are left white in the diagram are filled in with the mould previously removed from the trenches A and B in the manner and order already explained.

BLANCHING.

Several vegetables in very general use

plant. With lettuces there is no better plan than tying.

EARTHING-UP.

A term employed to describe the drawing up of soil about the stem or stalks of any growing plant, as, for example, peas, beans, potatoes, celery, leeks, and many other plants. It induces the growth of rootlets from the stem in some cases, and affords greater shelter for the roots. In the case of the potato it facilitates the formation of tubers, which are found below and around the bottom part of the haulm and near the surface. It is desirable also to draw up the soil round the stalks of cabbages of all kinds.

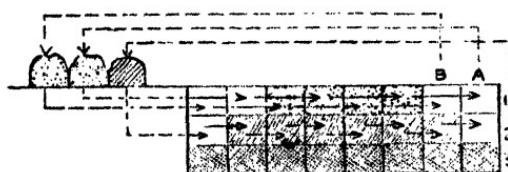


FIG. 2.—SECTIONAL DIAGRAM SHOWING TRANSFER OF EARTH FROM TRENCH TO TRENCH IN TRENCHING.

require blanching—celery, seakale, endives, lettuces, &c. The first of these is blanched by earthing-up, full instructions for which will be given under the culture of the vegetable. Seakale is blanched under pots prepared for this purpose, and covered over with litter, sand, ashes, or leaves.

With regard to endive, the best plan is to place over each plant, when full grown, a large tile or slate, which will effectually exclude all light, and blanch the endive in a few days. Some gardeners tie the plants up with bass or twine; but the plan is objectionable, as in wet weather the rain will run down the endive-leaves and rot the hearts of the plants. Endive is best blanched, perhaps, by putting a flower-pot turned upside down over the centre of the

INOCULATING.

This term in gardening is usually confined to a peculiar process of creating grass lawns by distributing over the surface of the ground small pieces of turf, rolling them in, and leaving them to take root and get together. The process, if properly carried out, is a very good one. The pieces of turf should be free from weeds and the surface made level to receive them.

MULCHING.

This operation consists in spreading a layer of stable dung litter, decaying leaves, and other materials over the roots of trees or plants, especially those which have been recently transplanted, and in times of drought watering through it. After a time the material used, whatever it may be, may be forked into the soil. The term "mulching" may be understood to apply to covering the external surface of the ground with any material, whether for the purpose of enrichment of the soil and the consequent stimulation of the roots below, or as a

means of intervening between the ground and the drying action of the sun or wind, and thus keeping the soil moist and protecting the roots. Every newly planted tree should have a mulching of some sort spread around it.

NAILING.

This is a difficult operation, for nailing is no ornament, and the less it shows itself the better. The gardener's skill must be exerted to conceal his nails and shreds as much as possible. Cloth list or shreds of old cloth are generally used; but strips of leather or black tape are preferred by some, under the supposition that they not only have a neater appearance, but afford less harbour for insects. Fruit-trees should be nailed close on to the wall, but ornamental shrubs, &c., should be merely fastened in for the sake of support.

THINNING OUT.

A term applied to the act and work of removing shoots and branches of fruit-trees that are either unnecessary or in the way, and which, if left, would, with those that remain, be too numerous for the tree to support, and at the same time yield fine fruit. It is also applied to the removal of seedling plants sown in rows or drills, or even broadcast, as turnips frequently are, the removal of intermediate plants, leaving others at certain distances from each other, giving room to those that remain to grow to their proper size.

TRANSPLANTING.

Aspect.—In transplanting any tree or shrub, especially evergreens, be careful to preserve the same aspect; that is, keep the same sides to the north, south, east, and west, as before. This will greatly facilitate the speedy establishment of the in its new situation.

Transplanting is an im-

portant operation, and in a general way November is the best month for it, but the work may be done in December with equal safety, and even in January, although it is better to have it done before December has passed away. The removal of small trees and shrubs is a comparatively easy matter and simple in itself: it is in the case of large trees and shrubs that the work becomes more difficult and laborious.

Replanting of Young Trees, &c.—The planting of young trees and small shrubs is so simple as scarcely to require instructions. Always make the hole considerably larger than the space required by the roots, whether few or many, so that they may find soft recently removed soil to grow in; and yet the soil must not be left too loose. If so moist as not to need watering, which will moisten and also consolidate the soil, it may be gently trodden down under the roots.

Transplanting is a remedy recommended for over-luxuriant growth; it is, however, only applicable to young or dwarf trees. It is performed in autumn; the roots being trimmed and shortened, and the tree carefully replanted in a suitably prepared station. The check is usually followed by an ample abundance of fruit buds in the following year.

WATERING.

In watering fresh-potted plants, it is important that the whole of the soil be effectually moistened, which can only be accomplished by filling up two or three times with water. No fear need be entertained of over-watering: if the plants have been rightly potted, all surplus water, beyond what the soil can conveniently retain, will drain away. Irregular watering is frequently the cause of failure in plant-culture, even with experienced growers. A certain amount of tact is

necessary in giving plants, which have been so neglected, just as much water as they should have, and no more. In watering, much depends on the weather, and also on the season: plants require less in winter than in summer. The proper time to water them in winter is when they are in bloom, or growing rapidly—in summer, as soon as the least dryness appears; but a little practice will be more useful than a lengthy description. In giving air, it may be observed that all plants which are not tender, that is, all plants which are natives of temperate climes, may be exposed to the air at all times when the thermometer indicates a temperature above 40°, except in case of rough winds or heavy rains. Hardy plants may be exposed at any temperature above 32°; for, although frost will not kill them, it may spoil their appearance for a time. Plants in bloom should never be kept close, or exposed to wet or wind: the flowers last longest in a soft, mild atmosphere, free from draught. Plants should never be wetted overhead in cold weather, or, rather, while they are in cold atmosphere; and never, except to wash off dust, should those having a soft or woolly foliage be so treated; but some plants, as the camellia, myrtles, heaths, and others with hard leaves, may be plentifully syringed, or watered overhead from

a fine rose, in warm weather, especially when in full growth.

Plants in full growth coming into bloom always require more water than plants past their meridian and waning to decay. Therefore Chinese primroses, chrysanthemums, early flowering epacries, camellias, heaths, early cinerarias, &c., will require much more copious supplies than late-flowering fuchsias, geraniums, begonias, &c. Semi-stove plants, such as gesneras, gloxinias, globe amaranths, achimenes, &c., which, owing to their great beauty, it is desirable to keep in bloom throughout October in the conservatory, will now require very little water. In reference to all such, and stove plants in general subject to conservatory treatment, it is of immense importance to bear in mind that the lower the temperature in which they are placed the less water they require, and *vice versa*. Cold, which stimulates man's assimilating organs to the utmost, paralyses those of plants in the exact ratio of its intensity. Hence the necessity of a stinted regimen in cold weather if vegetable life is to be preserved in full vigour. These remarks are applicable to all plant structures, but are particularly applicable to a house where luxuriant health should ever appear adorned with a wreath of floral beauty.

WE are now brought to the third part of this section, in which mention is made of the principal tools necessary for garden use. In order to make reference to them as easy as possible, they are given in alphabetical order.

TOOLS ESSENTIAL FOR GARDEN USE.

Of garden tools the essential kinds are the spade, the dung fork, and the rake, because with these all the operations for which other tools, such as the hoe, &c., are employed, may be performed, though with much less facility,

expedition, and perfection. To however, must be added the digging fork, which is indispensable. Of instruments of operation, the most necessary are the knife, saw, shears, scythe, and hammer. Of instruments of direction and designation, the garden line, measuring rod,

level, and label, of whatever kind it may be, are the most requisite. Of utensils, the most necessary are the sieve, flower pot, watering-pot, and handglass. Of machines for garden labour, the essentials are the wheelbarrow, roller, syringe, and hand forcing pump; and of traps and vermin engines, the mole trap, the mouse trap, the fumigating bellows, and gun. Of course, amateur gardeners will prefer the mowing machine to the scythe, but when the purpose and use of each tool enumerated above is carefully considered, it will be conceded that in the above list are reckoned all that the average gardener absolutely requires, and that none are mentioned which he can do without or which are unnecessary to him. For a description of the different kinds of tools required for garden work, see under the name of each tool.

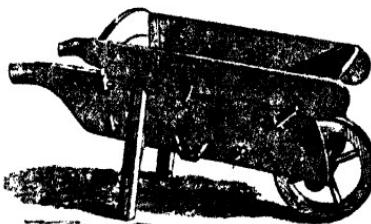
AXE.

This is a powerful tool which is too well known to need much description. It is used chiefly in forestry, in felling trees and in cutting through the large roots when the portion underground below the collar is under removal. It varies in size from the ordinary small hatchet to the woodman's axe, which consists of a broad, wedge-shaped blade, set on the end of a handle from $2\frac{1}{2}$ feet to 4 feet long. It is useful rather in landscape gardening than in gardening proper, or horticulture. Hatchets cost from 2s. to 2s. 9d. each; axes, about double as much.

BARROW, OR WHEELBARROW.

The accompanying illustration shows the most useful form of wheelbarrow for the garden. Appliances of this kind for carriage and transfer of mould, manure, garden produce, &c., are made in wood and iron. A good wooden box barrow, made by any country carpenter, will cost

from 25s. to 30s. Iron barrows on the same principle are sold at prices varying from 20s., or even less, to 35s. The wheelbarrow may be described broadly as a box open at the top, supported behind by two legs, and in front by a wheel, on which it may be driven forward when the legs are lifted off the ground by means of the handles that project from the hinder part of the barrow, and which usually form part of the frame-work on which the body or box is supported. The back of the barrow is best formed by a movable slide working between ledges nailed on to the insides of the sides of the barrow so as to form grooves for the reception of the slides. The capacity of the barrow for light stuff



WHEELBARROW.

in the form of litter, leaves, grass, &c., may be increased by having a light wooden frame to fit over the top of the barrow. This should be just large enough to slip over the outside of the barrow, and be held in place by buttons at the side, or by thumbscrews. If made flush with the sides of the barrow it can be secured by hooks and eyes.

BARROW CARRIED BY HAND.

A frame of wood consisting of two long pieces placed lengthways with the ends fashioned into handles, connected by three shorter pieces placed transversely and tenoned into mortices cut in the longer pieces to receive them. The central part of the frame thus made is covered with

boards from $\frac{1}{2}$ in. to $\frac{3}{4}$ in. in thickness, the whole forming a strong and solid platform on which plants in large pots or tubs may be carried from one place to another without injury. When a great many plants in



HANDBARROW.

small pots have to be carried in the handbarrow, it is better to add legs to the frame and put a railing round the platform, or furnish it with sides and ends, converting it into a kind of box.

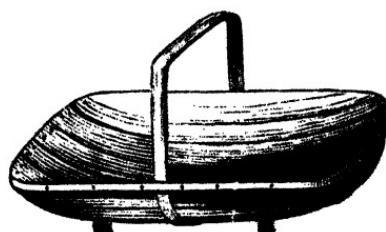
BASKETS FOR GARDEN USE.

One of the most useful baskets for garden use is that which is usually known as the Sussex or Trug Basket, and which is illustrated in the accompanying engraving. This basket is almost square in form as far as the edge is concerned, though the bottom is rounded. It is made of broad laths of wood fastened to a narrower lath, which forms the edge of the basket. Another lath is bent over the basket, and securely fastened to it to form the handle, and ledges, curved above to fit the bottom and flat below, are nailed to the bottom in order that it may stand steady when placed on the ground. Being made of solid wood, these baskets may be used as mould scuttles or carriers, for collecting weeds and stones, for gathering the firmer kinds of fruit, such as apples and pears, and for the reception of vegetables when picked or cut, and roots when taken from the ground. They are, in fact, serviceable for every kind of garden work.

BILLHOOK.

This useful tool is indispensable for sharpening the ends of pea sticks, espaliers, stakes, and poles of all kinds used in the

garden. Billhooks are used in pruning trees and trimming hedges rather than for fruit trees, although they may be utilised for cutting off the boughs of large trees in orchards, in which apple trees, pear trees, cherry trees, and the trees that are usually found in orchards, have attained such a growth and require such a lopping as may be fairly effected by means of these instruments. The common forms of billhook are represented in the accompanying illustration, A having a square-shaped broad blade, rather wider at the top than at the bottom, and slightly curved or hooked at the extremity, and B having a sickle-shaped blade of the form of a crescent. The edge of blades of both types is wedge-shaped—that is to say, bevelled on both sides to the cutting edge in the centre of the thickness. This construction gives greater facility of penetration to the edge of the blade when the blow is delivered. The bills in the illustration are represented with short handles; but they are furnished with handles ranging from 9 inches to 5 and even 6 feet in length, according to the work that is to be done with them, the shorter handles being more suitable when



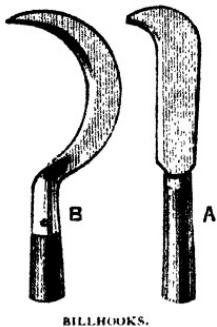
SUSSEX OR TRUG BASKET.

lopping off large boughs, and the longer handles for trimming and pruning hedges. There are various shapes of blades in use for this implement, but the principle in all is the same. In some, however, the back is serrated to form a saw, in which

case the bill is adapted to do the duty of a pruning saw.

BROOMS.

The ordinary birch broom, which is made of a number of small branchlets of birch, cut very nearly to one length, and bound together about the sharpened end of a wooden stick which serves as a handle, and which is driven into the centre of the mass after the ends have been cut even, in order to render this part of the broom, which has been already bound up as tightly as possible, still more tight, is the best for all garden purposes, as it is useful in all its stages



BILLHOOKS.

from its first state to its last. When new, the fine ends of the twigs render it an excellent implement for sweeping turf and gravel walks, and when these ends are worn away and the broom has become stiff and stubby, it is still useful for scattering worm casts on grass and for sweeping up paths and courts paved with small blocks of stone, cobble stones, or pebbles. For hothouses, greenhouses, and structures in which flat paving or tiles is used as flooring, a broom of whalebone or bast, inserted in small bundles, in a rectangular piece of wood, and fastened in with wire after the manner of a brush, is most suitable. Inferior brooms of this sort are made by putting the bast into the holes made for its

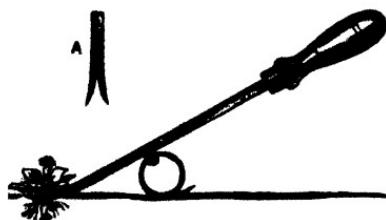
reception, and fastening it in with hot pitch ; these may do good service for a short time, but they are by no means durable, and therefore are not cheap. Brooms of iron or copper wire are sometimes used for mossy lawns, paths grown with moss, and for clearing from the trunks of trees, but they are seldom if ever seen now. A birch broom costs from 3d. to 6d., and a good bast broom from 1s. 6d. to 2s.

CHISEL.

Sometimes old trees of considerable size are renovated by cutting off the head and inserting grafts into the stumps of the branches that are left on the main stem or trunk. The branches are first removed with the saw ; but as a saw cut is ragged, and a clean, smooth cut is always necessary for the quicker and more effectual healing of the wound thus inflicted, the rough surface produced by the abrading action of the teeth of the saw must be smoothed over with a chisel. For this purpose the ordinary carpenter's chisel will do, always provided that it is at least one inch in breadth, and very sharp. Sometimes the chisel has to be called into action to slit or notch a stock for the purpose of grafting, and for this purpose a chisel termed the garden chisel is used, which differs from the carpenter's chisel in being wedge-shaped by bevelling on both sides instead of on one only. There is a strong chisel, known as the forest chisel, used in forestry for separating small branches close to the bole or trunk with a clean cut. The blade is broad, and sometimes has projections curving backwards on both sides, which are usually called ears ; the handle is from six to ten feet in length, so that branches that are some distance up the trunk of a tree can be lopped off with facility. The edge of the chisel is placed under the branch, and the end of the handle is then struck with a mallet. In pruning

DAISY FORK AND RAKE.

orchards, a variety of the forest chisel is used, having a guard at a little distance from the edge of the blade to prevent it from penetrating into the wood beyond a certain



SHORT FORM OF DAISY FORK.

distance, and thus causing an injury which was never intended. With a chisel of this kind a large bough may be severed by carrying the chisel cuts round it; but any necessity for its use is obviated by using the saw and smoothing the cut over with a chisel afterwards.

DAISY FORK.

Daisies should never be allowed to flower: a good daisy rake, with a little trouble, will remove all flowers as they come out; but the only plan to clear a lawn effectually of these disagreeable weeds is to take them out with the daisy fork wherever they are found. This handy little tool is made in different forms, or rather with handles of different lengths, but the principle is the same in all. A short form of the fork is shown in the accompanying illustration. This consists of an iron shaft about $\frac{1}{4}$ inch square, set in a wooden handle. The extremity of the iron is formed into a cleft fork, as shown at A. This fork is thrust into the ground, so as to take the daisy plant between the prongs or tines. The iron ring which is attached to the iron is then pressed against the ground, and acts as a fulcrum, on which the cleft end is raised when the handle is pressed downwards. The raising of the cleft end

lifts the daisy out of the ground. It is sometimes used to remove docks and dandelions, but it is not so effectual for these weeds, which have long tap roots which are firmly secured to the ground, and generally break when an attempt is made to lift the plant. Daisies, and indeed all weeds, are more easily removed in wet weather, or after a shower, than when the ground is dry.

DAISY RAKE.

A daisy rake is very easily made. Its form and construction is shown in the annexed wood engraving. First of all a thin plate of iron is obtained, and cut into broad teeth along one edge: the iron should be just so thick as not to bend easily to pressure or any resistance. Two slips of ash are then cut out, each being of the length of the iron, and about $\frac{1}{8}$ inch in thickness and 2 inches wide. These are bevelled towards the inner edge—the upper one but slightly, and the other to the thickness of $\frac{1}{4}$ inch. The iron is placed between them, and the two pieces of wood and the iron are all firmly fastened together by stout screws or rivets. A handle is then put into the rake, as shown in the illustration.



DAISY RAKE.

Holes should be drilled through the iron plate to admit of the passage of the rivets and handle. The teeth of the rake should be slightly bent upwards, or, in other words, slightly curved.

DIBBLE OR DIRBER.

This is an indispensable tool in any garden where much planting out is done, and must be called into requisition for the transference to open ground or other quarters of most plants that are grown in seed beds originally, and then planted apart at regular and wider intervals. The best form of dibble is shown in the accompanying illustration. It may be described as a short piece of rounded wood, terminating in a blunt point at one end, and a handle like that of a spade at the other; indeed, the handle of an old spade is one of the best and most handy things possible for conversion into a dibble. The pointed end is thrust into the earth to a sufficient depth, and the root of the plant, whatever it may be, is thrust into the hole, and the earth brought round it by two or three thrusts of the dibble into the soil at a short distance from the plant itself. When it is desired to make holes of a certain depth, or to make a number of holes of uniform depth, an iron socket should be made, with a projecting piece on one side and divided on the other, with a plate on each side of the division, which may be tightened or loosened by the action of a thumb-screw, so as to admit of the socket being easily shifted up and down the stem of the dibble, or

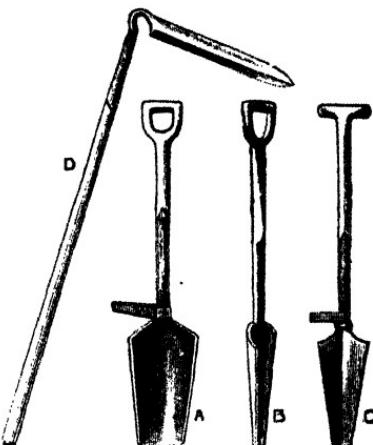


DIBBLE.

being held immovable in position, as may be found requisite. This is the principle of the potato dibble, which, however, is longer, and in which the projecting piece at the side is fixed at a certain distance from the point. There are other forms of dibbles, but this is the most common, the most useful, and generally preferred by gardeners.

DRAINING IMPLEMENTS.

The implements used in draining are a spade, and in deep draining, and in a clay soil, a series of two or three spades, varying in size, and each sloping to the point, and



DRAINING IMPLEMENTS.

slightly rounded, so as to make a circular cut; a spoon-like implement also is required for lifting the loose soil clear out of the bottom of the trench; and a level, which may easily be formed by fixing three perfectly straight-edged boards in an upright position and in a triangular form, held together by a vertical board in the centre, with an opening at its base for a line and plummet. The usual form of a trench for drainage is shown under *Drainage*. The broader spade A is used for making the upper and larger part of the trench, and the narrower spades B and C for forming the lower and smaller part in which the drain pipes are laid. The tool D shows the shape and form of the implement for clearing loose earth from the bottom of the trench along which the pipes are laid.

EDGING TOOLS—FORK.

EDGING TOOLS.

Lawns and beds cannot be kept in good order without the frequent use of edging-irons, otherwise known as turf rasers or verge cutters, and edging-shears. The latter, as its name implies, is used for shearing off the long grass which grows on the edges of turf. A turf raser or verge cutter is an instrument that is used for cutting the edge of turf to be taken up in rolls from grass land for the purpose of laying down on lawns, or for cutting the edges of lawns already laid, turf verges, beds, &c. The simplest form of raser is shown in Fig. 1. In this, a stick or handle, bent at the end, so that the horizontal part may rest flat on the turf when held by the operator, has a coulter-shaped knife or cutting-iron inserted close to the bend. An iron ring should be put over the handle on each side of the blade, partly to strengthen the tool and partly to keep the cutter in position. When pushed along in front of the workman the blade cuts the turf in a line of any length, and to the depth at which the knife is set. It is useful only for cutting turf to lay down on lawns. In Fig. 2, an ordinary tool for cutting the edges of lawns, &c., is represented. This consists of a crescent-

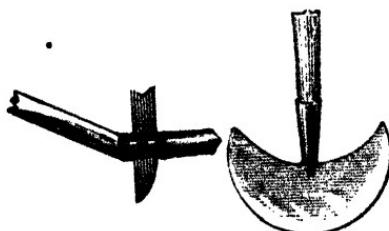


FIG. 1.—TURF RASER. FIG. 2.—VERGE CUTTER.

shaped blade, with an iron socket in the centre, into which the handle is put. The use of using it is obvious.

EYED NAILS.

In stone walls—perhaps in brick walls also—copper or iron nails with eyes should be let into the interstices, to tie down the branches of the fruit trees, taking care that they are let in with the eye close to the wall; for the radiation of heat from the wall is in proportion to its distance, and the heat which is one degree a foot off the wall, is a hundred and forty-four when in contact with it. The advantage of the eyed nails consists in preserving the wall. Thread dipped in pyroligneous acid, or flexible wire, may be used for the purpose of tying. This mode of fastening is much neater than shreds and nails.



EYED NAIL.

FORK.

This tool is as indispensable as the spade, and even more so, for it is possible to do all the necessary work in a small garden containing nothing more than a few borders for flowers with an ordinary border-fork. It is handled in much the same manner as the spade, the only difference being that the handle is inserted into a socket proceeding upwards from the centre of the head of the fork, and does not enter the top of the blade as in the spade. For gardening purposes, forks are made with three, four, and five prongs; but for digging and trenching, a fork with four prongs is the most suitable. The lower part of each prong should be of steel, and the upper part and the tread and socket of the best scrap iron, and the prongs of all forks used for digging and trenching should be slightly curved. Fig. 1 shows the ordinary digging fork, and this may be taken as the general type of tools of this class, the prongs being about 9 or 10 inches in length. This fork will serve for all ordinary purposes, but for trenching and breaking up

ground at some little depth below the surface, a fork with stronger and broader prongs should be used. In Fig. 2 the border or lady's fork is shown, a tool with slight



FIG. 1.—ORDINARY DIGGING FORK.

prongs, square above and pointed at the extremity, similar in structure to the ordinary digging fork, but much smaller, the prongs being about 6 or 7 inches in length. The smaller fork is most useful for border work in stirring the surface soil to the depth of two or three inches, an operation which is known "pointing." When borders receive a top dressing of well-rotted manure in the late autumn or early winter, it should be mingled with the surface

soil by pointing with this fork. Being light and small, and having the prongs tolerably close together, it is possible to finish the surface of a border as

neatly with this fork as with a rake, any large stones, pebbles, &c., that are brought to the surface being picked off with the hand.

HAND FORK.

This handy and useful form of fork is supplied with a long handle, as shown in Fig. 1, or with a short handle as shown in Fig. 2. Either kind may be used with one hand. The prongs are broad and pointed. These forks will be found useful

and serviceable in transplanting border plants, and in working the surface of the soil in borders in which growing plants stand closely together—too closely, in fact,



FIG. 2.—BORDER OR LADY'S FORK.

for the safe use of the pointing fork. They are also useful for taking up asparagus and other roots that are not too large for removal by such means, and for putting aside bark, cocoanut fibre, &c., for pots that require plunging in these materials. Garden forks, or weeding forks, as they are sometimes called, with short handles, are sold in three sizes, and range in price



FIG. 1.—GARDEN FORK WITH LONG HANDLE.

from 1s. to 2s. 6d. each, according to quality; and the prices of those with long handles are much the same, the extra length of handle making but little differ-

HAMMER AND APPLIANCES USED IN WALL TRAINING.

The hammer used by the gardener in training trees on walls is, from its



FIG. 2.—GARDEN FORK WITH SHORT

shape, usually known as a "claw hammer." Its shape is shown in Fig. 1. It has a striking face on one side or at one end, and the other is slightly curved and

divided, so that it may be used for extracting nails in walls, by grasping the head of the nail in the cleft and pulling the handle backwards. By this means the nails are easily lifted out of the bricks in which they are driven, but before applying leverage to the nail by means of the hammer, it is desirable to give it two or three light taps on the head. This enables the nail to be withdrawn more easily, and without bringing away a part of the surface of the brick, which has the effect of leaving an ugly mark upon it.

The head of the claw hammer is attached to the handle by two straps, one each side, and held in place by rivets passed through straps and handle. If the hammer used is not a claw hammer, the nails should be withdrawn with a pair of common pincers, and worked gently backwards and forwards before any attempt



FIG. 1.—CLAW HAMMER.

made to remove them. The gardener's hammer should be tolerably heavy, and shorter in the handle than one which is used in carpentry. A hammer weighing about 1 lb. or 1½ lb. will be found sufficiently weighty for nailing trees to walls. The gardener's claw hammer may be had for 1s. or 1s. 6d.

Garden Nails.—The garden nail, or nail for brickwork, is made of cast iron, and is square in form as shown in Fig. 2. It is the only kind of nail that can be driven into brickwork. Wrought nails are altogether useless for this purpose. Being of cast iron, they are brittle, as may be supposed, and will easily break if not struck fairly and directly on the head, or if the point encounters any hard substance in the brick. They are usually made in two

and are sold at from 2d. to 3d. per pound. The cast-iron nails, though excellent for brickwork, are useless for wood, and if trees have to be nailed to wood wrought nails should be used, nails having a head, or clout nails, as they are called, being the best for the purpose.

Shreds.—These may be made out of the list of flannel, or from any odd pieces of woollen cloth or old clothes. They should be cut in strips from 2 to 4 inches long and from $\frac{1}{2}$ inch to 1 inch in breadth. When greater holding strength is required than a single thickness will give, a larger shred should be cut, and a double thickness used, either in length or in breadth.

FIG. 2.—GARDEN NAIL.

HOES AND HOEING.

As the pick is used for loosening hard soil, and the spade and fork for preparing and working mould that is sufficiently loose in itself to be readily penetrated by this implement, so the hoe may be said to have its special use for cleansing purposes, though it is also serviceable in loosening and stirring the surface of the soil amid growing crops, as well as for destroying weeds. Hoes are of many forms, but they may be broadly classified as draw hoes and thrust hoes. As these names imply, the draw hoe is pulled towards the operator, and the thrust hoe is pushed from him. Hoes for the most part are made with sockets, into which a handle of ash preferably, but sometimes of pine, is inserted, and when the shank of the socket is long enough it is secured to the handle with a rivet. The handle of a hoe should be from 4 to 5 feet in length. The handles of draw hoes are usually shorter than those of thrust hoes. The chief varieties of draw hoes are shown in Fig. 1, in which



represents the short-neck hoe, *B* the long-neck hoe, *C* the swan-neck or Bury hoe, from the bent formation of the part of the neck between the blade and the socket,

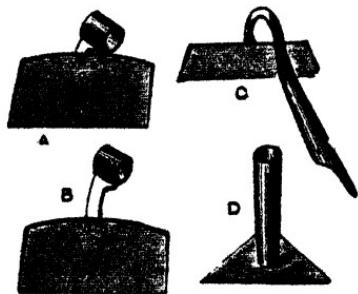


FIG. 1.—VARIETIES OF DRAW HOES.

Short neck Hoe. *B. Long-neck Hoe.* *C. Swan-neck or Bury Hoe.* *D. Triangular Hoe.*

and *D* the triangular hoe. This last form of hoe is convenient for cutting up weeds, as its corners are sharper than those of the hoes with square blades, and the corners of the blade are always used for cutting out and pulling away weeds from the soil. Sometimes hoes were made with a slight wedge-shaped shank, like the tang of a chisel, &c., which was driven into the end of the wooden handle, splitting being prevented by encircling the end of the handle with an iron band ring, about $\frac{1}{2}$ inch or $\frac{3}{4}$ inch wide. The varieties of the thrust hoe are shown in Fig. 2, for the weeding tool called a spud may be regarded as a variety of thrust hoe. The Dutch hoe, or scuffle, as it is sometimes called, is shown at *A*. It consists of a sharp and comparatively narrow blade, attached to the socket by two arms, which spring from the lower end of the latter, and are fastened at their extremities to the blade, one on one side and one on the other. The blade of the hoe being thus attached forms an angle with the handle, and by this means is almost parallel to the surface of the soil when in

use. The edge is thrust into the earth with a pushing motion and cuts up the weeds, which, with the surface soil, pass through the aperture between the arms. By this arrangement the tool meets with far less resistance, and the labour is rendered far lighter than it would be if the opening was closed, or even if the socket for the handle proceeded immediately from the centre of the blade. The spud, shown at *B*, consists of a stiff narrow blade, with a socket to admit of its attachment to a handle. It is used for cutting up docks, dandelions, thistles, and other weeds. There is another form shown at *C*, with a horn proceeding from the upper left-hand corner of the blade. This projection is utilised as a hook for pulling up weeds, or hooking down any tangled growth, &c. All kinds of hoes, except the swan-neck, the triangular hoe, and the spud, are made in sizes ranging from 3 inches to 10 inches, measuring along the edge of the blade, increasing by 1 inch from the smallest to the largest. The smallest size of swan-neck hoe is 4 inches: the largest size of triangular hoe 8 inches, the former going

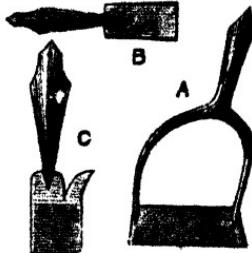


FIG. 2.—VARIETIES OF THE THRUST HOE.

A. Scuffle or Dutch Hoe. *B. Spud.* *C. Combined Spud and Wood Hook.*

up to 10 inches, and the latter commencing at 3 inches. Spuds are made in three sizes, namely, 2 inch, $2\frac{1}{2}$ inch, and 3 inch. Short-neck, long-neck's, and swan-neck hoes are also made with blades having a curved

KNIVES USED IN GARDENING.

or crescent-shaped edge, in which case they are called halfmoon hoes.

KNIVES USED IN GARDENING.

Knife, Budding.—In the operation of budding, the bud has to be prepared for insertion, and the necessary incision made in the stock and the bark raised for its re-

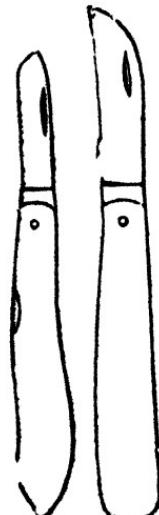


FIG. 1.—BUDDING KNIVES.

ception, and therefore the form of the blade must be adapted for these purposes, and the form of the handle as well. The shapes in which budding knives are usually made are shown in Fig. 1. Strength is not required in them, they therefore are altogether smaller in size than pruning knives; but although the blades are small, they must be very keen and adapted for making a clean incision as well as for making a clean cut. For this purpose the blades of both the

knives that are figured in the illustration are

well adapted; but perhaps the form of the smaller one is preferable. The handle is of bone or ivory in every case, these materials being of a smooth surface, and capable of being reduced to a thin spatula-shaped termination, suitable for lifting the bark on either side of the incision for the insertion of the bud. A heart-shaped termination, such as is found in the knife known as Goodsall's Budding Knife, is perhaps the most convenient for accomplishing the purpose for which it is specially required. Budding knives cost from 3s. to 4s. 6d.

Knife, Garden.—This is a knife for all ordinary purposes which should be carried by every gardener. It may be had with or without a joint, as preferred; but one with a broad and strong curved blade, set in a buckhorn handle with a slight curvature in the opposite direction, without a joint, and carried in a stout leather sheath, is preferable. This kind of knife is shown in Fig. 2. The handle, as will be noticed, is larger at the bottom than at the top, from which the blade issues. This enables the operator to hold the knife with a firmer grip, and to apply more force or power when cutting away a bough of some size from a shrub, &c., as he often must do. There is a flat plate at the bottom of the handle, which may be utilised for loosening old garden nails, or even for driving a garden nail on an occasion when no hammer is within reach, or it is not worth while to fetch one.

Knife, Grafting.—This is similar in form to a pruning knife, and, indeed, pruning knives may be used for this purpose. Keenness of edge is indispensable, and when the bark has to be lifted, as is the case in some kinds of grafting, the handle should be made of some smooth material and with a wedge-like termination, as in the case of the budding knife.

Knife, Pruning.—This description of



FIG. 3.
PRUNING
KNIFE.

FIG. 2.
GARDEN
KNIFE.

knife is shown in Fig. 3. It should be furnished with a buckhorn handle of the same form, or very nearly so, as that of the garden knife; but it should be made with a joint, so as to be closed when out of use, and it is not amiss if the spring at the back be so constructed as to prevent any chance of the knife closing when the operator is using it. The edge of the blade should be straight, or all but straight, from haft to point. The blade, moreover, should be of the best steel, and kept scrupulously keen. It may be asked why one knife will not serve for all purposes. The reply lies in the fact that in pruning it is necessary to make a clean cut across the bough or branchlet that is severed from the tree, and that the bark should be cut all round as cleanly as the wood that it incloses, without leaving any shreds or stripping when the cut is made, which shows that the knife is blunt or not so sharp as it ought to be, or that the operator is unskillful in the use of his tool, or has not made the cut at the proper angle, which is an angle ranging from 30° to 45° to the axis of the branch that is cut. The greater the angle, the less the chance of making a clean cut and of leaving a little flap of bark at the upper end of it stripped from the portion that is cut away. It is undesirable to use a knife for which sharpness is indispensable for any other purpose than pruning, and hence an ordinary garden knife should be kept for rougher work. The blade of the pruning knife is not so large, broad, and heavy as that of the garden knife. Good garden knives and pruning knives may be bought at prices ranging from 1s. to 3s.

LABELS.

Labels for plants are made in various ways and of various materials. Labels for suspension to the plant itself, or for attachment to a stick to be placed close

to the plant, may be made of metal, deal, earthenware, horn, bone, ivory, and even leather, and attached to trees and plants capable of bearing them, or to the wall or supports on which the trees are trained. A convenient size for such labels is 3 inches long and 1 inch broad. When made of any of the materials specified these labels are distinguished as permanent labels, in contradistinction to temporary labels, which are made of cardboard, or coarse linen, with a face that can be written on, and having a brass eyelet hole, through which a piece of string or raffia may be passed for attachment to the plant. These temporary labels are soon destroyed by exposure to the weather, and therefore are suitable only for attachment to plants during transit from the grower to the buyer. A temporary label of more than usual strength and endurance is manufactured by Messrs. Dennison and Co., Shoe Lane, Fleet Street, E.C. In addition to these there are labels made of zinc, and used, according to their make, either for placing in the ground or in pots, or for attaching to the branches of trees, sticks, espaliers, rafters, &c. These are made of different shapes, and some of different sizes of the same shape. Yeats's Indelible Ink, an ink expressly prepared for writing on zinc labels, is supplied at 6d. per bottle. Metal labels possess an advantage over wood labels in being very more durable, and therefore cheaper in the long run.

LADDERS.

The garden ladder should be light and portable, and that the utmost lightness as well as a maximum of strength may be attained, it is desirable that the sides should consist of the best red deal or pine sawn and planed, connected with oak rungs or staves, and having three rungs in the form of iron bolts with nuts, as shown in the accompanying illustration.

MOULD SCUTTLE—MOWING MACHINE.

These iron rungs should be placed one in the centre and one at each end, so as to form the end rungs but one in each case, the end rungs being of oak. The iron bars are made with a shoulder at each end, against which the sides of the ladder are butted, and the ends are screw-threaded to carry nuts. When the bars, both wood and iron, are all placed in position the nuts are screwed up, and the ends of the oak staves are cut off close to the outer surface of each side of the ladder, and split and wedged up. The object in view in making a ladder in this manner is to produce a perfectly rigid framework of the greatest possible strength compatible with the dimensions of the sides, the length of the ladder, and the lightness necessary to ensure portability. The sides of the ladder, at least, should be painted, and the bars, both of iron and wood, may be treated in the same manner. From 10 to 15 feet will be found a convenient length for an ordinary ladder, although in the case of large fruit-trees covering the end of a house or building, one of even greater length will be necessary. It is desirable to have two or three ladders of various lengths, from 6 or 8 feet upwards, for short ladders will often be found useful in dealing with fruit-trees and climbers on walls of moderate height, and they are always more convenient than steps, and can be lodged against a wall with less chance of injury to trees, &c.

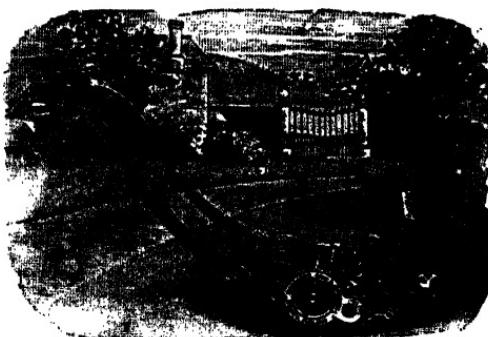
MOULD SCUTTLE.

All kinds of carriers are desirable and necessary for garden use; and for carrying sifted mould from one place to another, for potting or for lightening or

altering the character of soil in a spot in which it is desired to place any particular plant, and which cannot be approached by the wheelbarrow, there is nothing more handy than a wooden box—whether round or square, it matters little, that is to say, whether it be a box or a pail—with a piece of strong wooden hoop nailed across it to form a handle. This contrivance is handy, and all the more so because it is shallow, and the earth, if necessary, easily taken out with a trowel. The ends of the hoop should be turned under the bottom of the box and nailed to it.

MOWING MACHINE, WHEN TO USE.

A scythe works better in the morning when the dew is on the grass, or when it has been wetted by a slight shower of rain, so when mowing is effected by means of the seythe it is better to get the work done early in the morning. The mowing



RANSOMES' LAWN MOWER.

machine, which works on an entirely different principle, acts more smoothly and pleasantly when the grass is dry, and may therefore be used even at midday, when the sun is at its hottest. Neglected lawns that it is sought to bring into better order, should first be cut with the scythe early in the morning, and run over with

the mowing machine later in the day. With some machines it is said that any kind of grass can be cut, whether long or short, but with the generality of machines it is better to deal with short grass than with long. To produce a soft elastic velvet-like surface of fine short, close grass, a lawn should be run over with the machine at least once a week.

Although alike in action and general principle, there are so many of these useful machines in the market that it would be a matter of the utmost difficulty to afford space for a description of them, with a list in detail showing sizes and prices. All that can be said is that no gardener should be without one suited to his requirements and the size of his lawn, &c. Half the battle goes in looking up the best makers; and intending purchasers would do well, before deciding on a machine, to consult the price lists sent out by such makers as Messrs. Ransomes and Co., Ipswich; Messrs. T. Green and Son, Limited, Leeds and London; and Messrs. Barnard, Bishop, and Barnard, Norwich.

NAME AND NUMBER STICKS.

These are identical with number sticks, and are prepared in the same manner. The only difference between the number stick and the name stick is that the former bears a number only and the latter the name of the plant to which it is affixed. Name sticks are used rather within doors in pots than out of doors. In all cases it should be sought to render the name as indelible as possible. This may be done by rubbing the stick with white lead, and by writing on the surface thus produced with a lead pencil. An excellent kind of pencil for this purpose is Woolff's Indelible Pencil, which is prepared especially for this purpose, and sold by all nurserymen at 2d. each.

Number Sticks.—Supposing that a register of plants, trees, &c., is made

and kept, it is desirable to consider here by what means of a simple character sticks bearing numbers corresponding to the register may be prepared, so that they may be placed close to the plants, &c., which the numbers indicate. It may be said at once that number sticks suitable for the purpose may be bought of the nurserymen in bundles of 100 each, with the face of each rubbed over with white paint, at from 6d. per bundle upwards, according to size. Sticks, however, of a very small size, such as are sold at 6d. per 100, although large enough for pot culture, are not of sufficient length for setting in the open ground, and should not be purchased for this purpose. For cheapness' sake it is better to get a bundle



NUMBER STICK.

of laths from the lath-render, and to cut these up into lengths varying from 5 to 10 inches long, and to smooth the face or front and sharpen the point, as shown in the accompanying illustration. The upper part on both sides should then be well rubbed over with white lead, or dressed with white paint, and the number written on the face with a tolerably hard lead pencil, cut to a broad point. The bottom of the stick should then be dipped in coal tar, or painted with a composition made of boiled linseed oil, thickened by the introduction of finely powdered coal dust, until it is brought to the consistency of thick cream. Number sticks prepared in this way will last for a considerable time.

NETTING.

Netting is extremely useful for many gardening purposes, to protect blossom from frost and fruit from birds. It may

PICKAXE AND MATTOCK.

also, with very good effect, be suspended beneath both wall and standard trees to catch any falling fruit. Netting of a fine of the best wrought iron, tipped or mesh may be used successfully to keep off the attacks of wasps and flies.

Old fish-netting mended up can be purchased at 1d. per yard.

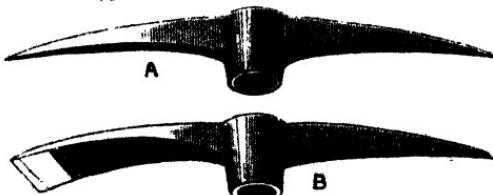
Wire Netting.—A useful appliance for garden work is found in wire netting, machine made and supplied in various sizes of mesh and strength of wire according to the purpose for which it is to be used. The form of mesh is hexagonal in all cases, from the smallest to the largest. The following table gives the prices of this netting per yard in rolls of 50 yards in length, and in various sizes of mesh; but it must be borne in mind that if a less quantity than 50 yards is required, the price per yard is increased one halfpenny. So this must be taken into account when buying or ordering.

WIDTH OF NETTING.	WIDTH OF MESH.			
	1 inch.	1 inch.	1½ inches.	2 inches.
18 inches	s. d.	d.		
24 "	0 4	2½		
30 "	0 5	3		
36 "	0 10	4		
48 "	0 75	4½		
	0 10	6		

The first use of this netting is as a protection to flower beds, seed beds, &c., from the inroads of cats, &c., or for light fencing for separating one part of a garden from another. When used in this way, iron stakes or standards are necessary as supports, unless wooden stakes be used, along which the wire may be stretched by the aid of tenter hooks or small staples.

PICK.

The blade, or head, should be made pointed with steel. Both ends are



A. PICK PROPER. B. PICK FOR GARDEN USE.

alike in this tool, and both are pointed, as shown at A in the accompanying illustration. The handle should be made of sound, well-seasoned ash. The head is slipped over the upper end of the handle, and forced into its place at the other end, by letting the end fall in a succession of blows on a block of wood, or stone, or even hard and solid ground. It is released by going through the same process with the other end of the handle. The handle should be from 2 feet 8 inches to 3 feet in length, according to the height of the person who will mostly use it. A form of pick better adapted for garden use is shown at B, one end being pointed as the ordinary pick, and the other broad and in the form of a wedge-shaped blade.

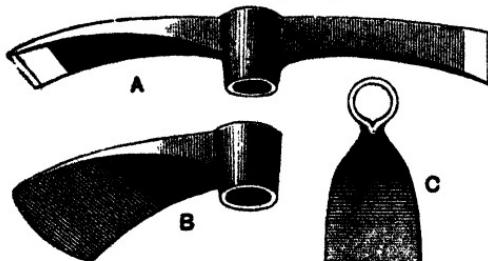
PICKAXE AND MATTOCK.

These are tools which are closely allied to the pick, being modifications of it in form. The pickaxe is shown at A. It will be noticed that one arm is in the form of an axe, and the other in the form of an adze, as in the left-hand side of the garden pick shown above. Sometimes this form of pick has one of its arms in the form of an axe, instead of taking the adze form; but whatever its shape may be, whether adze-like or axe-like, it is used for the same purpose,

namely, for loosening hard soil and for cutting roots. The pickaxe, as at A, with one arm like an axe and the other like an adze, is used more especially for

round pointed nails, are set at right angles to the under surface of the bar. The teeth are usually slightly curved, as shown in Fig. 1, but sometimes they are straight, and sometimes, instead of being

like a cylindrical curved peg, they are flat, and as wide as the bar of the rake, but set in the bar with the width of the tooth transversely to the bar, so that the edges of the teeth meet the soil, &c., when the rake is in use. The teeth of rakes are generally 1 inch apart, and the rakes are made in sizes containing from four to twelve teeth in light rakes, and from



A. PICKAXE. B. MATTOCK. C. VIEW OF MATTOCK FROM TOP, SHOWING SHAPE OF IRON.

taking up the roots of trees that have been felled, or for uprooting trees. Another form of pickaxe, known as a mattock, is shown at B. It has a broad adze-like blade on one side of the socket only. Its shape, when viewed from the top, is shown at C. It is used for loosening surfaces and masses of earth that are not so hard as to necessitate the use of the pick.

RAKE.*

The rake is a tool that is not so much required in the flower garden as in the vegetable garden, where its use is necessary in order to bring the surface of the

soil to some uniformity of fineness, and to draw the earth over seed that has been newly sown, either in drills or in patches. Four to sixteen teeth in strong and extra-strong rakes. A socket is attached to the bar at right angles to it, and in this a round, straight ash or deal handle, of about 5 feet in length, is inserted. There are other varieties in rakes used in gardening, such as the ordinary haymaker's wooden rake, which is used for the removal of grass, &c., from lawns.

REEL AND LINE FOR GARDEN USE.

Practically, a couple of stakes and a piece of strong cord are all that are absolutely necessary for marking out a straight line between any two points, but far less time is taken up in winding a line round a frame which forms part of the garden reel than in turning and turning it round a stake a little thicker than one's thumb. The shape shown in the accompanying illustration exhibits a very common form of garden reel and line, but whatever the form may be the principle is alike in all. The reel consists of a central stake or pin of iron,



FIG. 1.—GARDEN RAKE.

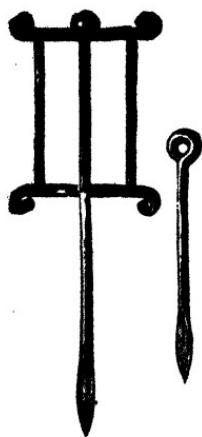
It is also necessary for drawing weeds, stones, &c., together in a heap prior to removal. The rake itself consists of a straight flat bar of iron from $\frac{1}{2}$ inch to $\frac{3}{4}$ inch wide, in which teeth, resembling

sharp points at the lower end, and so constructed above that an iron consisting of top, bottom, and two sides, revolves upon it easily. The pin passes through holes made for its reception in the

ROLLERS—SPADE.

top and bottom piece of the frame. One end of the line is secured to the pin or tied to one side of the frame, and then wound round the sides of the frame. The other end

of the line is tied to an eye projecting from another stake or pin, as shown in the illustration.



GARDEN LINE AND REEL.

Nary garden rollers are of two kinds, known as single cylinder and double cylinder rollers, so called because the cylinder of the former is one and the same piece of metal from side to side, whereas in the latter it is in two equal and similar parts. There is a third kind of roller, known as the water-ballast roller, which is so constructed that the interior can be filled with water, thus considerably increasing its weight when necessary, and giving the owner the advantage of using it either as a light or heavy instrument at pleasure. The best rollers of all kinds are made with balance handles—that is to say, there is a weight attached to the lower part of the framework and placed within the roller—and this weight being much greater than that of the handle and framework attached to it taken together, always seeks the lowest point, and thus keeps the handle upright, a great advantage, both in placing the handle out of the way when the roller

is stationary on the lawn or elsewhere, and in keeping it in this position when out of use and put away in the tool-house or wherever it may be kept.

SPADE.

This indispensable tool is a broad blade of plate iron, rectangular in form, attached to a handle of tough ash, the upper end of which is in the form of a D, or fitted with a transverse bar, like the head of a crutch. The D form is most convenient for digging. The lower part, or edge of the blade, should be of steel, and the upper part of the best scrap iron, well welded together. The blade is hollow at the top, for the reception of the lower end of the handle, and from it run in an upward direction two straps, one in front and the other behind, which are fitted to the handle, and secured to it by rivets. The space between the front and back part of the blade is covered with a narrow iron plate, called the tread, which affords support to the foot of the operator when it is pressed on the blade in order to force it into the soil. The transverse bar of the D-shaped handle is apt to split, as the



GREEN'S PATENT GARDEN ROLLER.

grain runs transversely to its length. It should therefore be strengthened by boring a hole of small diameter through it, into which is inserted a piece of iron wire,

riveted over a small plate at each end.



All the best spades
garden hose or any other appliance that
are made in this
way. There are
many different va-
rieties of spade for
trenching and dig-
ging, distinguished
by some slight
peculiarity of con-
struction; but all
of them are suffi-
ciently similar to
the type shown in
the London Treaded
Spade, in the ac-
companying illus-
tration, to require
no separate de-
scription. The
gardener's spade is
made with a broad
straight edge, be-
cause this form is
better calculated to
hold and lift masses
of earth, and to
penetrate equally all
over the bottom of
the trench, than a pointed tool. Spades
suitable for the gardener's use are made
in four sizes, numbered 1, 2, 3, and
4, proceeding from the smallest to the
largest. Of these, Nos. 2 and 3 are useful
sizes for amateurs.

washing and refreshing the foliage when
may be used for the purpose is not avail-
able. They assume different forms, the
cheapest and simplest being a zinc pipe,
closed at one end with a perforated disc,
and open at the other, into which a rod of
wood, with a turned handle and a piece of
felt or coarse woollen stuff wrapped round
the opposite end, is introduced to act as a
piston to draw in the water through the
holes in the closed end, and to drive it out
when full by thrusting the rod into the pipe.
A syringe of this kind has its merit in being
cheap and serviceable, but it is inconvenient
on account of the tendency of the water to
reach the hands both from the outside and
the inside of the tube. This is obviated to
a great extent by the use of a brass syringe,
which, although the principle of action is
precisely the same, is nevertheless more
carefully constructed, being closed by a cap
at both ends—that at the upper end con-
sisting of a fine spout for the emission of
water in one jet which diverges when it
leaves the orifice, or of a rose for its wider
dispersion. Instead of the thick wooden
rod of the zinc syringe, a smaller metal rod
is attached to a wooden handle, the rod
passing through a hole in the cap at the
lower end, and terminating within in a
suitable piston. Syringes of this descrip-
tion are made in various sizes, and supplied
at prices varying from 1s. to 19s.

SYRINGE.

It is impossible to manage a greenhouse without a syringe wherewith to sprinkle growing plants, vines, &c., with a refresh-
ing shower, and to inject into all parts of the house the water that is necessary to maintain a sufficient degree of moisture within the structure. Syringes are also useful in the garden for throwing water over trees and shrubs for the purpose of

TROWEL.

This is a tool that no one can possibly do without, as it is frequently required both in planting and transplanting and in potting. It consists of a shovel-shaped blade, with the sides turned up, so as to better hold and retain anything that may be taken up in it. A bent neck, with a tang to it, is riveted to the top of the blade in the centre, the tang being inserted in a neatly turned handle, with a ring round the part at the

TURF BEATER AND SPADE.

entrance of the tang to prevent splitting. Garden trowels, as shown in Fig. 1, are reclassified as "light," "strong," and "best," and are made in sizes of 5, 6, 7, and 8



FIG. 1.—GARDEN TROWEL.

inches in length. The fern trowel is longer than the ordinary garden trowel, and the blade is also curved from top to point, as shown in Fig. 2. They are made in one size only. In transplanting small seedling plants and cuttings the utility of the trowel is very great, for a hole may first be made in the soil with it for the reception of the



FIG. 2.—FERN TROWEL.

plant, and the plant may then be lifted bodily, with the soil about its roots undisturbed, and gently deposited in the hole made for it.

TURF BEATER.

This consists of a flat piece of wood about from 9 to 12 inches square and 3 inches thick, with a handle fixed to the upper surface of the wood, as shown in the accompanying illustration. The handle must be tolerably long, and must be inclined to the



TURF BEATER.

block of wood at such an angle that when raised and brought down on the turf, the under surface of the block may fall flat upon it. The end of the handle should not

be cut at an angle, but inserted just as it is in a hole cut in the wood for its reception.

TURF SPADE OR TURFING IRON.

Closely allied to the shovel in form, though it is used for a very different purpose, is the turf spade or turfing iron, illustrated in the accompanying engraving.

This implement, which is required only by professional gardeners, unless the garden or series of gardens may be large enough to bring it occasionally into requisition, either for cutting fresh turf or for removing the sward from the surface already covered in order to remedy inequalities, is a

heart-shaped steel blade, riveted to a bent shank terminating in a socket for the reception of the handle. It is thus formed that the blade may be thrust under the turf in a direction parallel to the surface without inconvenience. Turf is generally marked out into rows 1 foot in breadth, and the edges of the rows are cut

from end to end with a spade or any sharp instrument. The rows are divided in the same way into lengths of 3 feet. The turf spade is then passed under each length, and they are then rolled up for removal. When the removal of any inequality of surface is the object in view, the turf need only be rolled or lifted back, so as to lay bare the spot to or from which some soil is to be added or taken away, as the case may be. It is also useful for cutting turf from pasture ground to be laid

WATER POTS—FLOWER STICKS.

by in heaps to rot, and thus form mould, although for this purpose turf may be cut well enough with a spade or shovel. The numbers, indicating sizes, and the prices of cast steel turfing irons are as follows :— No. 0, 6s. 6d.; 1, 7s. 6d.; 2, 8s. 6d.; 3, 9s. 6d. If handles are required, they are supplied at 1s. extra.

WATER-POTS.

The principle of the water-pot is the same in every case, but the form of these appliances differ slightly one from another. They are made of tinplate and zinc, and unless lightness is a desideratum those of zinc are preferable, because they are more durable than those of tinplate, though they

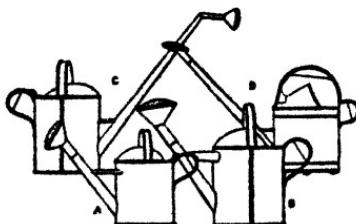


FIG. 1.—DIFFERENT FORMS OF WATER-POT.

are heavier to carry. Zinc pots are generally sold unpainted, but those of tinplate are supplied in two colours, red and green, the red being the cheaper. The body of the water-pot is cylindrical in form, with a flat bottom, with three bosses or feet of metal attached to the larger and better kinds to keep the bottom from touching the ground when out of use, and partly covered with a crescent shaped, slightly domed top, the object of which is to prevent the escape of water over the brim of the cylindrical body when tilted, as it would do if there were no cover. Some of the different forms are shown at A, B, C, D, in Fig. 1, in which A represents the ordinary form, with the rose attached in the

usual way; B, a pot of the same construction as A, but with a small circular base or 'feet' attached to the bottom; C, a larger, more ornate version with a decorative top and a spout extending from the side; D, a smaller, squat version with a spout on top. In the dotted line AB, it is manifest that the water will continue to run out through the upper extremity of the spout until no water remains in the vessel except a little below the dotted line AE, which cannot well escape through the spout. In the "Paxton" pot the handles, as may be seen, are in one piece, and run in one direction from front to back. This arrangement is obviously more convenient for carrying by hand, when the position of the hands in carrying a pail of water or two pails is considered. Watering-pots are made in seven sizes, numbered respectively from 0 to 6. Those that are painted red are always cheaper than those that are painted green, because red paint is cheaper than green paint. Red watering-pots range in price, according to size, from 1s. 2d. to 5s. 9d., and green watering-pots from 1s. 6d. to 6s. 6d. "Paxton" watering-pots are sold at prices ranging from 3s. 3d. to 9s., according to size. Water-pots of galvanised iron, with brass screw rose, are now supplied at about the same prices, and are recommended as being stronger and far more durable.

WOODEN FLOWER STICKS.

Sticks should only be used when absolutely necessary, for they are not ornamental. When needful, they should be concealed as much as possible and firmly fixed. Sticks painted green are the least conspicuous of those made by hand, but natural sticks cut from the hedges are more desirable. The following are the approximate rates at which made sticks are supplied per 100 according to length :—

	Plain.		Painted.		Plain.		Painted.	
	s.	d.	s.	d.	s.	d.	s.	d.
1 foot	1	6	2	6	3½	foot	3	6
1½ "	2	0	3	0	4	"	6	6
	3	0	4	0	4½	"	7	6
	3	6	4	6	5	"	8	6
	4	0	5	6			10	6

Let us now glance briefly at the manure and manner of manuring necessary for garden ground, as well as its collection and the sources whence it is obtained.

MANURE.

Collecting and preparing manure, and transporting it where it is wanted, are operations that should be attended to when other operations become impossible. The waste, not only of liquid, but solid manure, in this country, is enormous. Everything that has ever been endowed with life, and all the excreta proceeding from them, are available for manure. Their nature, qualities, influence, and the mode of their application, may be endlessly varied ; but all alike possess a power of enriching the earth. The hard texture of bone or wood fibre may render it desirable to subject them to chemical action, or the influence of fire, to render them more speedily available to the wants of plants ; but these hard substances possess the elements of plant-food in common with the soft constituents of plants and animals. The influence of sulphuric acid upon bones is well known. When fire is used to break down or soften woody fibre, it should be applied so as to char, and not to burn it. Charring is effected by covering the heap of wood to be operated upon with turf or earth, so as almost entirely to exclude the air, and thus insure slow combustion. Almost any vegetable refuse, including roots of weeds, can be charred ; and this charcoal, saturated with urine, is one of the best fertilisers. It may be usefully drilled in with seeds, in a dry state. The scourings of ditches, scrapings of roads, decayed short grass and weeds, half-rotten leaves, soot, and every bit of solid manure that can be got, should be collected and thoroughly mixed together. The excreta of most animals are too rank and strong for flower-garden purposes, applied in a

pure state ; by mixing, however, with the various substances named above, the bulk of the manure may be quadrupled ; it will be sooner available, and much more valuable. There are many very useful fertilisers now supplied for garden and greenhouse use, and among these With's "Improved Universal Carbon Manure," to be obtained from the Hereford Society for Aiding the Industrious, Bath Street, Hereford, and Jensen's "Norwegian Fish Potash Manure" appears to be the most valuable.

Manures and Manuring.—In dressing garden-ground, stick to the contents of the muck-heap, and do not rely too much on the efficacy of artificial manures. The muck-heap, composed of turf-parings, charred rubbish and clearings of the garden, the contents of the closet deoderised for transit, by the addition of a little dried earth, and saturated by the slops of the house, which will consist largely of urine, rich in nitrogen and alkaline salts, will form a compost which puts heart into the land, as bread and beef sustains and puts muscle into a man ; while artificial manures are to the land as stimulants or tonics to the human being, useful for a season, but imparting no lasting and enduring benefit, and incapable of rendering fit to keep up a sustained effort over a considerable period of time. Artificial manures, useful as they may be for the crop that immediately follows on their introduction, are soon exhausted, and leave no traces of their influence if not constantly renewed. To do this is simply to throw away a great deal of money that might otherwise remain in the gardener's pocket. He will find the contents of his muck-heap, if properly prepared, far cheaper to himself and far more

beneficial to the land, for its influence is imparted by degrees and not immediately and at one time, as time is taken in its complete dissolution after its committal to the ground, and in its dissolution it adds to the *humus*, or vegetable mould, which forms so essential a part of fertile soils, and supplies, or is the means of supplying, all growing plants with the food that is so absolutely necessary to their growth and well-being. This is just the reason why leaf-mould enters so largely into the composition of compost for potting.

The compost of the muck-heap should have reached a sufficient stage of decomposition before it is mingled with the soil. To effect this it is desirable that it should be frequently dug over. In the suburbs of large towns, where ground is valuable and space limited, it often happens that kitchen gardens are severely over-tasked, though a prevailing notion that high tillage and abundant manuring make up for extent of room. This is true to a certain extent; but it has its limits, for instances are not wanting to show that serious and vexatious results are traceable to this cause. The ground gets filled with insects, undecomposed manure is worked into the soil after each crop—it is trenched in, dug in, or laid on the surface as mulch sometimes; all manner of undecomposed rubbish and garden refuse is trenched 3 or 4 feet deep. The result is obvious; for where there is decomposition, or putrid fermentation takes place, many agencies are attracted thither to hasten the work; insects are bred in vast numbers, club and canker become prevalent, and good gardening becomes impossible. The remedy for this state of things is either a copious manuring with unslaked lime, burning the soil, or the substitution of new soil, if the surface-parings of a pasture are conveniently obtainable. But prevention is always better than cure. Manure should be thoroughly

decomposed or rotted, so that it is not likely to breed insects; and before it is applied to the ground, it should be well incorporated with an equal quantity of loamy soil. Where ground is heavily worked—as, for instance, where a spring crop of lettuces, an autumn crop of potatoes, and a winter crop of greens have been obtained from the same piece of ground—manure alone will not supply the whole of the loss, but the addition of new soil may do so. Another mode of prevention is to adopt a well-defined system of rotation: such measures will keep the ground in good heart; but this must be considered under its own heading.

COMPOSTS.

The successful flower grower should always have at hand—

1. All the leaves which can be got together, except those in the shrubberies, which should be dug in.
2. A heap of clean road-grit.
3. A heap of sand, silver or river.
4. A good stack of turfs cut from some pasture, three inches or less in thickness.
5. A heap of cow-dung.
6. A heap of stable-dung, which is most suitable for the present purpose when taken from an old hothed.
7. A stack of turf-peat from a common.
8. All the waste of the garden should also be placed where it may rot, for it is a capital dressing; because, when once fairly rotted into mould, it is next in value to pure leaf-mould.

We hear and read a great deal of all manner of exciting composts, such as guano, nit-ht-soil, bullock's blood, offal of the slaughterhouse, sugar-bakers' scum, and various other not very nice material; but all this resolves itself into the single fact that all animal matter, as well as animal dung, enriches the ground—bone-dust, shavings of horn and hoofs, among the

rest. There is an uncertainty about the strength of all these materials which renders them unsuited for delicate and valuable plants, although, for farming operations and coarse-vegetable growing, they are valuable. A collection of florists' flowers cannot be played with, and their existence would be often placed in jeopardy by exciting composts, of which the strength is not easily ascertained; whereas all those materials which we have recommended are known. Beyond these we may mention rabbit, sheep, and even poultry droppings, which may be obtained for the purpose of using as liquid manure after being thoroughly decomposed; such liquid manure being made by stirring a pound of rotted poultry dung, or half a peck of rabbit-, sheep-, or cow-dung, in eighteen gallons of water for two or three days, and, when settled, it is fit for use.

HARVESTING OF SOILS AND COMPOSITS.

The first and most important kind of manure comes from the farmyard. This in its fresh state, consists of the refuse of straw, of green vegetable matter, and the excreta of domestic animals. Horse dung varies in its composition according to the food of the animal; it is most valuable when they are fed upon grain, being then firm in consistence and rich in phosphates. Sheep litter is a very active manure, and rich in sulphur and nitrogen; for if a slip of white paper, previously dipped in a solution of lead, be exposed to the fumes of fresh sheep dung, the paper will be blackened; a sure test of the presence of sulphur.

Cow litter is cooler, and less rich in nitrogenous or azotised matter; but it is rich in salts of potash and soda, and thus better adapted for delicate and deep-rooted plants. Swine's dung is still less azotised and more watery, and full of vegetable matter; but the most important of all

manures is the urine from the stables and drainings of the dung-heap, which is wasted daily to an enormous extent. "The urine of carnivorous animals," says the authority we have already quoted, "is rich in the principles urea and uric acid. In herbivora, hippuric acid takes its place; but in all cases it is rich in nitrogen, and, when allowed to putrefy, ammonia is evolved. Urine is thus one of the most important constituents of farmyard manure."

COMPOSITION OF SOILS.

There are some five or six well-ascertained varieties of soil, characterised according to the preponderating proportions of silica, lime, clay, vegetable mould, marl, or loam, which they contain.

(a) **Sandy** soils contain 80 per cent., or thereabouts, of silica—that is, of the crumbling *dbris* of granite or sandstone rock.

(b) **Calcareous** soils contain upwards of 20 per cent. of lime in their composition.

(c) **Clay** soils contain 50 per cent. of stiff unctuous clay.

(d) **Peaty** soils or vegetable mould, the richest of all garden soils, contains from 5 to 12 per cent. of *tumus*—that is, decomposed vegetable and animal matter.

(e) **Marly** soil is the *dbris* of limestone rock, decomposed and reduced to a paste. It contains from 5 to 20 per cent. of carbonate of lime.

(f) **Loamy** soil is soil in which the proportion of clay varies from 20 to 25 per cent.; sand, and various kinds of alluvium, making up the remainder.

COW-DUNG.

Charred cow-dung is an excellent manure for almost all purposes, and by charring it, it is fit for immediate use. Take some old wood and build a cone two or three feet

high ; then procure some green cow-dung, and cover the cone nine inches thick ; let it drain for a day or two ; cover it with weeds or rubbish, and set fire to the wood, regulating the draught so as to prevent the fire burning too fiercely ; and by the time the wood is consumed, you will have a fine crust of charred cow-dung. This mix, when broken up, with composts. A few pieces of it at the bottom of the pots in which calceolarias, pelargoniums, cinerarias, or pines or vines are grown, will be found a most excellent manure.

GUANO.

This, which is nothing more than the droppings of sea-birds, dried and pulverised by the heat of the sun, is an important manure, which is collected in small islands on the coast of Peru and some other parts of the world, and imported in large quantities into the United Kingdom. Its weight per bushel is about 70 lb. ; if heavier than this, the additional weight per bushel would tend to show that it has been subjected to adulteration. By analysis it has been found that very nearly one-half consists of organic matter, of which about a fifth part is ammonia ; about a fourth part of the entire mass is calcic phosphate, and of the remaining fourth about two-fifths are alkaline salts, a considerable part of which is phosphoric acid. There is no doubt that guano affords a valuable manure, useful for all purposes in the garden. It is very similar in its constituents, and the relative quantities of each that it contains, to farm-yard manure, but being more highly concentrated and therefore less in bulk, and differing from the latter in being dry instead of wet, it is more handy for use in small gardens, and therefore demands the attention of all whose gardening is restricted to space and operations that are alike limited in character.

LIME.

This is one of the most important manures that we possess. In trenching new ground that it is sought to bring into cultivation by deep digging, it should in many cases be accompanied by the incorporation of lime with the soil, which sweetens, quickens, and enriches it.

Action of Lime.—The action of lime is chemical and not mechanical. "Lime, employed as a manure," says Scoffern, "performs three well-marked functions at least, perhaps more : in all it is a powerful ameliorator of soils, and under two series of conditions it should be used in different forms. New-burned caustic lime is a powerfully corrosive body ; when brought into contact with animal and vegetable tissues, it rapidly disorganises them. Even if the tissues be living, still the quicklime will effect their disorganisation. Hence arise the following deductions. When we have to deal with a rank new soil, teeming with noxious seeds, and with seeds ready to spring into life on the first opportunity, or when the object is to convert hard animal tissues, such as horn or kelp, or even softer ones, as clippings of woollen cloth, into a useful manure, unslaked lime is employed. On the other hand, when the object in adding lime to the soil is to supply the calcareous element as a mechanical means of ameliorating the texture of the soil, and a physiological means of supplying food to certain crops, and where there are no weeds nor noxious germs to destroy, nor organic tissues to decompose, then the employment of lime should be in the mild or slaked state." In both its forms, therefore, lime is a powerful agent in the improvement of soils, especially those in which clay and peat exist to any extent.

Benefits of Lime.—It is not possible to lay down any precise rule for the application of lime as a manure, and the quantity to be used must depend chiefly on the soil :

itself and its special character. When and mellowed by its presence, and the ground is first taken into cultivation it may be applied in considerable quantities, but on land that has been already utilised for the production of crops it must not be used so freely. On clay lands a plentiful admixture is beneficial, and on soils on which much vegetable matter is dug in it is equally serviceable. On light lands it must be used but moderately, and even then it is better to mix it with soil, turf in course of disintegration, &c., so as to form a compost. The effect of lime is not immediately apparent, but shows itself the second or even third year after application. This, of course, does not apply to its use for the destruction of worms, slugs, grubs, &c., which promptly feel and acknowledge the application of caustic lime and lime just slaked. Stiff and heavy lands are lightened

crops that are yielded by land judiciously limed are heavier, better, and earlier than those which it produced before liming.

LIQUID MANURE TANK.

In anticipation of a hot, dry summer, every garden should be provided with a liquid manure tank, and this may be easily and inexpensively made of an old tar-barrel either standing on the surface or sunk into the ground. The barrel should be filled about one-third with well-rotted cow dung and two-thirds pond or rain water, and occasionally stirred. As the liquid is used up, more water may be placed upon the sediment, which, as it becomes exhausted, can be replenished from the cow-yard and the stable-drain.

We are now brought to the fifth portion of this Section, in which a few necessary remarks are made with reference to the various modes of propagating plants and training and pruning fruit-trees. Firstly we are led to consider—

GERMINATION.

In a state of nature all plants are propagated from seed, and the multifarious forms of the seeds and envelopes with which they are provided form one of the many interesting subjects of investigation to the lover of nature. For the present purpose it is sufficient to state that most seeds are covered with a hard shell or envelope, which protects them from external injury, and that within the envelope lies the embryo plant. All seeds in this latent state contain an organ, or germ, which, under favourable circumstances, shoots upwards, and becomes the stem of the plant; another, called the Radicle, which seeks its place in the soil, and becomes the root; and the seed-lobes, which yield nourish-

ment to the young plant in its first stage of growth.

Moisture, heat, and air are necessary conditions for the development of all seeds; and most of them require, in addition, concealment from the light. These conditions are found in the open texture of well-pulverised garden soil, through which water percolates freely, and air follows, each yielding their quota of oxygen, hydrogen, and carbon, in a gaseous state, for the support of the plant. The great majority of plants cultivated in gardens are obtained by sowing the seeds in beds suited to their constitution, to be afterwards planted out where they are to grow and ripen their fruits, or seeds, or leaves. Leaves are the first outward sign of germination, and

throughout its existence, next to the roots, the most important organ of a plant. The seed-leaves, as the buds which first appear above the ground are termed, are of vital

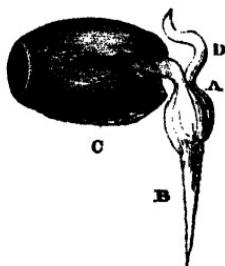


FIG. 1.—DIAGRAM ILLUSTRATING GERMINATION OF ACORN.

importance to the plant, and if destroyed prematurely, the young plant rarely recovers; therefore, the leaves of all young seedlings require protection from insects, worms, and slugs, their most dangerous enemies, as well as from severe weather.

Germination, then, is the natural process by which the embryo of the seed placed in favourable circumstances—that is to say, surrounded by moisture and heat and shrouded in darkness—throws off its shell or covering, and in course of time becomes a vegetable, resembling that from which the seed was obtained. From the time that the acorn of the oak is placed in circumstances favourable to its germination, it absorbs moisture, the cotyledon A (Fig. 1) swells, the root or radicle B is elongated, and the shell or envelope C is broken. The root issues by the fissure, and directs itself downwards into the earth; the plumule D erects itself, is disengaged from the shell, and becomes the stem, while the cotyledons furnish food to the young plant, until the first leaves develop themselves and the spongiotiles of the roots are capable of receiving nourishment from the earth.

In plants with a soft covering, as the bean, the radicle A (Fig. 2) is directed to the outside of the seed; it is the rudiment of the root, and this is the first part which develops itself in germinating. The plumule B, on the contrary, ascends towards the centre of the grain, and becomes the stem, while the two cotyledons C, C, remain in the soil between the root and stem, yielding nourishment to the young plant until the root can perform that office.

NATURAL PROPAGATION.

Speaking broadly and generally, natural propagation is effected by the development of a bud which proceeds from some portion of the plant, either root or stem as the case may be, that is below the surface of the ground, or from the stem proceeding from it at a point just above the surface. No matter what may be the mode of propagation that Nature selects, the offset, when ultimately separated from the parent plant, assumes a separate existence, and becomes an independent plant similar in every respect to that from which it sprang. Thus, the suckers thrown up from the root of a rose or any shrub that throws up shoots of this kind from below ground, when detached, with a portion of the root will speedily form new and strong. The rhizome of the primrose,

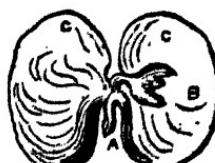


FIG. 2.—FORMATION OF KIDNEY BEAN.

&c., may be removed from the parent plant, and will soon send forth roots under favourable circumstances, if it be not already rooted before removal; and when

the new plant springing from the stole of the strawberry is once attached to the soil by roots of its own, the connecting link between parent and offspring may be cut away, rendering the latter dependent on itself for obtaining a supply of nourishment through its own roots. Every plant is provided by Nature with a suitable means of reproduction, whether by seed, or sucker, or stole, or rhizome.

Propagation by natural methods, or methods that are adopted by, or are in accordance with, Nature, are six in number, namely—(1) by seed; (2) by germs or bulbs, or, in a more comprehensive term, by offsets; (3) by slips; (4) by division of the plant; (5) by runners; and (6) by suckers; and under each method a special mode of treatment is not only desirable but necessary, thus :—

1. In Propagation by Seed, it is requisite to use seed the vitality of which is unimpaired. Under certain circumstances the vitality of seed will endure for thousands of years, as is apparent from the so-called "Mummy Wheat," which was grown from a grain of wheat found in the swathings of a mummy of the body of an Egyptian that had been embalmed and shrouded in its ceremonies for burial perhaps four or five thousand years ago, or even longer. When placed in the soil this wheat corn germinated and reproduced itself in great abundance. The maintenance of vitality was due in this case to the exclusion of the external air and moisture. Generally speaking, seeds retain vitality for one or two years only under ordinary circumstances, and from this we gather that—

(a) It is better to sow seed saved during the previous season, or, at the utmost, not more than two seasons old; and

(b) If it be desired to preserve the vitality of seed for a longer period than two years, it is necessary to keep it in air-tight receptacles, or, at least to exclude air

from the receptacles in which they may be kept as far as it is possible to do so.

In addition to age, due regard must be had to soil, season, and other circumstances. As a general rule, it may be laid down that seed should not be buried below the earth's surface at a depth greater than its own thickness of diameter, though it may be safely assumed that the depth may be increased with perfect safety in the case of seeds of leguminous plants, which are large and bulky in comparison with the generality of seeds. Thus, the tiny seeds of the auricula should be sprinkled on the surface of the soil in which they are sown, dusted over with a little fine soil and sand sprinkled on them by means of a tin pepper-box, a little moss being laid over them until they have germinated, in order to promote and preserve surface moisture. Larger seeds should be strewn on flattened surfaces prepared to receive them, and sprinkled over with a light covering of soil. Such seeds as onions, carrots, parsnips, &c., should be sown in drills made in the earth with the end or back of the rake, and have the ridge that is thus thrown up drawn over them. Peas and beans may be set at a depth several times their thickness or diameter in a shallow trench made for their reception by the end of the blade of the hoe. The smaller the seed, the finer should be the soil in which it is grown. The soil in which seed is sown should be tolerably dry—dry enough to crumble lightly when worked with the hand, and not to clot together in a pasty mass. Therefore, dry weather should be chosen for seed sowing, and if seed can be sown just before a gentle shower, or when the weather bids fair to be showery, so much the better. Of course, there is a proper time for sowing for every kind of seed, but this cannot be specified in a series of general instructions which apply equally to all. Place or position—that is

to say, whether in the open air or under protection—also forms an important factor with regard to time.

2. In Propagation by Germs, Bulbs, or Offsets, all bulblets, whether they proceed from the stem of the plant or from the parent bulb, immediately above the part from which the fibrous roots emanate, should be placed in light soil, at a depth equal to their own height below the surface, immediately after removal from the parent plant, otherwise they will dry up under exposure to the air and lose vitality. By some a distinction is drawn between the terms *bulbs* and *offsets*, the latter being applied to bulblets thrown off by the main bulb. But this is a nice distinction which is scarcely requisite. All bulblets are of necessity offsets.

3. In Propagation by Slips, it must be explained that slips are young shoots which spring from the collar or upper portion of the roots of herbaceous plants, as in the auricula or chrysanthemum, or from shrub-like plants, as thyme and sage. In some plants the shoot or slip may be stripped away from the upper part of the stem. When the lower part is sufficiently firm and ripe, the slip is stripped away from the parent plant in such a manner as to bring away a heel or projecting piece of the old wood, whether stem or root. The edges of the heel should then be trimmed with a sharp knife, and inserted in suitable soil, and shaded until it has commenced to send out roots. When slips are taken from the collar, they will often have roots already sent forth, or exhibit the rudiments of roots. These will of course grow more rapidly. Want of success in many cases may be traced to neglect in trimming the heel or base of the slip, as a callus is produced more quickly on a smooth surface than it is on a ragged one.

4. In Propagation by Divisions of the original plant is broken up into

pieces, and each piece, which will be found to consist of stem, leaves, and roots, may be planted separately, and will soon form a young and vigorous plant. This mode of propagation is resorted to in the case of all plants proceeding from rhizomes, as the daisy, polyanthus, Solomon's Seal, &c. in all herbaceous plants. Solomon's Seal, for example, may be cut into pieces, provided that each piece has an eye or bud from which it may sprout upwards, and roots below. Herbaceous plants should be divided in the spring, when growth is commencing. They will then separate readily into portions, each replanting with buds for its upper growth, and roots for its growth below ground.

5. In Propagation by Runners, all that has to be done is to peg down the runner, or place a weight on it so as to prevent it from being moved by any cause, and to give the young plant that issues from any knot or division an opportunity of rooting itself in the soil. When sufficiently well rooted, the young plant can be removed. This has been explained in speaking of plants that propagate themselves by stoles or runners like the strawberry.

6. In Propagation by Suckers, which in point of fact are underground runners, all that is necessary is to dig them up with care and to cut them away as near the parent plant as possible, so as to retain the roots which have issued from it between its point of issue from the main root, and that of its appearance above ground. All suckers should be headed back from one-fourth to one-half their length to lessen the demand on the roots for nutriment, immediately after separation from the parent plant. It is of the utmost importance that this direction should be implicitly observed, because, the more there is left of the plant left above ground the greater the demand on the roots below which have to renew their hold on the soil.

TUBEROUS PLANTS, PROPAGATION OF.

Bulbous-rooted plants may be propagated by seeds as well as by offsets in the form of bulblets or little bulbs, for the term is by no means to be restricted to tiny bulbs formed in the axils of the leaves of plants, as some are inclined to think, and tuberous plants also are propagated by seeds as well as by means of their tubers. With such plants, however, propagation by seed leads to the production of new varieties, while propagation by bulb or tuber must of necessity be resorted to in order to ensure the maintenance of the same variety. Thus, new varieties of the potato are produced by hybridisation from seeds, but if any variety raised from seed exhibits qualities which render its preservation and propagation desirable, this must be effected by offsets from its tubers. The dahlia is a tuberous plant, which is increased by offsets from tubers, or even by cuttings of sprouts from tubers, but new varieties must be raised from seed. Tubers, a term obtained from the Latin *tuber*, a hump or protuberance, from *tumeo*, I swell, are expansions of underground stems studded here and there with eyes or buds, and stored with starchy or succulent matter, which affords nourishment to the buds until their root growth is sufficiently progressed to admit of their deriving support direct from the soil. The turnip, parsnip, carrot, beetroot, and radish should be termed tuberoids rather than tuberous roots; they resemble genuine

many points, but they are not reproduced from offsets cut from them, but wholly from seed.

STOLE OR STOLON.

In some plants Nature has resorted to propagation by means of a loose trailing branch or stem, called a *stole* or *stolon*, from the Latin *stolo*, a twig or shoot springing from the stock of a tree, which is sent

forth from the plant at the summit of the root, just where the leaves spring from the stem. This branch or stem proceeds from the original plant to some distance, and then takes root downwards and sends forth leaves upwards, frequently continuing its growth beyond the first attachment to the soil, and rooting at intervals, forming a new plant at each rooting. Plants that propagate themselves in this manner are called *stoloniferous*. The strawberry affords a familiar example which is known to every one, and another is found in the Trailing Saxifrage, *Saxifraga sarmentosa*, sometimes called "Mother of Thousands."

LAYERING PLANTS.

Propagation by layers consists in taking means to arrest the circulation of the sap on its return from the extremities to the roots. In this operation an upward slit is made half across a joint; and when the part so cut is fixed in favourable soil a callus or callosity (from the Latin *callus*, hard, thick skin) is formed. This hardening of the surface arrests the sap, and after a brief period roots are thrown out, and the branch becomes an independent plant. This process is adopted with pinks, carnations, roses, and many other plants. It is, however, a very important operation in gardening, and should be neatly executed.

In the case of roses and other shrubby plants, all that is required is to run the knife through a joint sufficiently so to make an opening or crack near it, and plant it three inches below the surface of the soil, securing it there with a peg, pressing the soil firmly round it, but leaving that part of the branch above the soil as erect as possible. The roots will soon form, when it may be separated from the parent tree and planted out.

LAYERING SHRUBS AND TREES.

With regard to the proper season for

layering plants, Loudon tells us that "in general the operation of layering in trees and shrubs is commenced before the ascent of the sap or delayed till the sap is fully up, and hence the two seasons are early in spring or at midsummer." This is applicable rather to trees and hard-wooded plants which are propagated by layering rather than to carnations and pinks, which are layered after the plants have done blooming—that is to say, from the middle of July to the middle of August. Ivy, jasmine, the wistaria, and many other plants of the kind, may be propagated by layers if necessary, though the last-named two send out suckers. Ivy will take root readily if merely pegged down, but it will root even more quickly if a notch or slit be made at the joint in which the trailing stem is brought into contact with or buried under the surface of the soil. Jasmine should be cut partly through a joint when laid down for propagation. The wound intercepts the flow of the sap backwards to the root, and the accumulation of the sap at the callus that is formed tends to promote the formation of roots. This, as it has been said already, is the main principle of propagation by layers.

BUDDING, OR SHIELD GRAFTING.

General Characters.—Grafts of this description present the following characters: they consist in raising an eye or bud with a piece of the bark and wood, and transferring it to another part of the same plant, or any other plant of the same species. Budding is chiefly employed on young shoots or trees from one to five years old, which bear a thin, tender, and smooth bark. The term "shield-grafting" is applied to it from the shield-like form of the base of the bud, as shown at A in Fig. 1, which is inserted into the cleft cut for its reception in the bark of the

Conditions.—The necessary conditions are, that the operation takes place when trees are in full growth, when the bark of the subject can be easily detached from the *liber*, and it may be performed generally from May to August. The buds adapted for the operation should present well-constituted eyes or gemmæ at the axil of the leaf; if they are not sufficiently so, it is possible to prepare them by pinching the herbaceous extremity of the bud, thus producing a reflux of the sap towards the base; and in about twelve days' time the eyes will have become sufficiently developed; then detach the bud from the

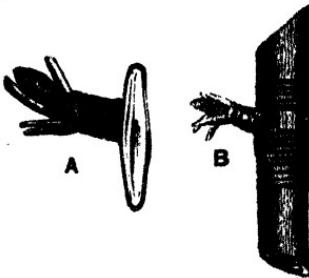


Fig. 1.—BUDDING—PREPARATION OF BUD. A. BUD; B. BUD INSERTED IN STOCK AND BOUND ON.

parent tree. Suppress all leaves, only reserving a very small portion of the petiole, or leaf-stalk, as at C in Fig. 2.

Removal of Bud and Insertion in Stock.

Having fixed upon the intended stock and bud, take a sharp budding-knife, and with a clean cut remove the bud from its branch, with about a quarter of an inch of the bark above and below; remove all the wood without disturbing the inner bark of the eye; for it is in this *liber*, or inner bark, that the vitality lies. Now make a cross-cut in the bark of the intended stock, and also a vertical one, T, and shape the upper part of the shield or bud, A, so as to fit it exactly. Having fitted the parts correctly, raise the bark of the stock gently

with the budding-knife, and insert the bud; afterwards bandage lightly above and below the eye, bringing the lips of the bark of the stock together again over the bud by means of the ligature, in such manner that no opening remains between them, and, above all, taking care that the base of the eye is in free contact with the bark of the stock.

Loosening of Ligature.—Some weeks after, if the ligatures seem to be too tight after swelling, they may be untied, and replaced with smaller pressure.

Budding in May.—Cutting Scion.—When the operation takes place in May, the scion will develop itself as soon as the suture is completed. In order to provide for this, cut the head of the stock down to within an inch of the point of junction immediately after the operation.

Budding in August—Treatment.—When the operation takes place in August, the head is never cut till the following spring, when the scion begins to grow. If the same practice as in earlier budding were followed, the consequence would be that the bud would develop itself before winter; and, having no time to ripen its new wood, it would perish, or at least suffer greatly. When the buds begin to grow,



FIG. 2.—OPERATION OF BUDDING.

they require to be protected from strong winds; otherwise they would be detached from the stem. This is done by driving a stake, A (Fig. 3), firmly into the ground,

attaching it by a strong cord to the stem of the stock above and below the junction, as in the engraving, and tying the shoot of the young scion firmly to the stake above, protecting it by a bandage of hay or other substance, to prevent the bark being injured.

Nature of Shoots.

—The shoots selected for budding or grafting, whether for fruit- or rose-trees, should be firm and well-ripened: watery shoots, or watery buds, are valueless. For grafting, the branches should be of the preceding year, well ripened under an August sun,—*août*, as French fruitists say.

State of Stock.

The stock should be in a state of vegetation slightly in advance of the graft; otherwise the flow of the sap is insufficient to supply the wants of the scion. In order to provide for this, the graft may be removed from the parent branch a little before the operation, and buried under a north wall until it is wanted; there it remains stationary, while the stock is advancing to maturity.

APPLIANCES FOR GRAFTING AND BUDDING.

In gardening nomenclature, the term "stock" or "subject" is applied to the tree on which the operation is performed; that of "graft," and sometimes "scion," to the portion of the branch which is implanted on it. The implements necessary for the operation are—a handsaw, sometimes made with a folding blade, the



FIG. 3.—MODE OF SUPPORTING GROWING SCION BY STAKE.

peculiarity of which is that the blade should be thin at the back, with very open teeth ; a grafting knife, with a chisel and mallet bevelled on both sides, used where the graft is too large to be cut by the knife ; and a supply of small quoins, or wedges of hard wood, to keep the slit open while the graft is preparing. The grafting knife is furnished with a smooth spatula, of hard wood or bone, at its lower end. A bundle of coarse hemp, or worsted thread, or of willow bark which has been softened and rendered pliable by being soaked in water, and some composition which shall protect the graft from the atmosphere and from rain, are also necessary, and these complete the appliances necessary in grafting. With regard to grafting wax, as these compositions are generally called, there are various preparations sold in the shops, some of which are composed of ingredients that are kept secret ; but many good gardeners are contented to use well-tempered clay—that is, clay of which the silicious or calcareous particles have been washed out, and pure clay only left. French gardeners use a paste composed of 28 parts black pitch, 28 parts Burgundy pitch, 16 parts yellow wax, 14 parts tallow, and 14 parts yellow ochre. This mixture is applied in a hot liquid state, but not so hot as to affect the tissues of the trees ; it is laid over the graft in coatings by means of a brush, until sufficiently thick for the purpose.

FIRST PRINCIPLES OF GRAFTING AND BUDDING.

Structure of Branch.—Before any one can hope to attain success in the operations known as grafting and budding, it is necessary that he should have a clear conception of the structure of the part that is operated on, and of the functions of the various parts of which the scions are composed at the point

of operation. When the stem or branch of a tree is cut across transversely, it exhibits a central mass of woody fibre within, surrounded externally by a ring-like covering or coating, which we term the bark. With regard to the woody portion in the very centre is the pith or medulla, which is supposed to possess the function of nourishing the buds until they are sufficiently advanced in growth to obtain nourishment for themselves. From the pith the medullary rays extend themselves through the woody fibre from centre to circumference, acting, according to Dr. Lindley, "as braces to the woody and vascular tissue of the wood," and conveying "secreted matter horizontally from the bark to the heart wood." These rays connect the pith and the bark, and form the medium of intercommunication between the pith within and the buds without. Broadly speaking, the sap ascends in spring from the roots through the woody fibre that is covered by the bark ; in autumn, having been matured in the leaves, it descends once again to the roots through the bark, or passes horizontally into the stem.

Bark : its Tissues.—The bark may be at any time separated in a mass from the woody stem, but this may be done more readily in spring or autumn, when the sap is ascending or descending. Looking at it casually, it appears to be a coating of homogeneous substance, rough and hard without when exposed to the air, and smooth and moist within at its contact with the woody stem. The coating, however, which we call the bark, is composed of tissues of widely different natures, and is composed of different layers, each of which possesses its especial function. First comes the epidermis, corresponding with the outer or scarf skin of the human body, often called the epidermis also which is perishable and renewable. The

removal of this bark is in no way injurious to the tree, and often it will split as the tree increases in size, and come away itself. Next to this outer coating is the true bark, consisting of two layers known respectively as the "outer" and "inner" layers. Within this is another bark, called the *liber*, or inner bark, composed of bundles of woody fibre. In the lime or linden-tree this *liber* is present in considerable quantities, and supplies the material for mats which we call bast, and useful for tying up plants. Within this third bark, intervening between it and the woody stem, is another layer of mucilaginous, viscid matter, called the *cambium*, more abundant and more active in spring than at any other time. It is uncertain whether this belongs properly to the stem or the bark. It is certain, however, that it is a connecting link between them, that both bark and stem are increased from it, and that it plays a most important part in the plant as a living, organised structure.

Cambium.—To all appearance the *cambium* is the chief means by which the growth and increase of the tree is maintained, the organ from which the growth and increase of the tree proceeds. *In grafting and budding, it is absolutely necessary that contact be effected between the cambium of the stock and the cambium of the scion.* If this be secured, the well-being and junction of scion to stock is certain; if not, the graft will fail. Hence it appears how necessary it is that this should be known to and recognised and understood by those who attempt grafting and budding. It is to insure a good contact between the *cambium* of the bark that

the bud and the *cambium* of the stock that the old wood taken away with the bud is removed before the latter is applied to the stock, and it is because the contact of *cambium* of scion and stock is

rendered more complete in budding than it is in grafting that the former operation is performed more frequently with success by amateurs than the latter.

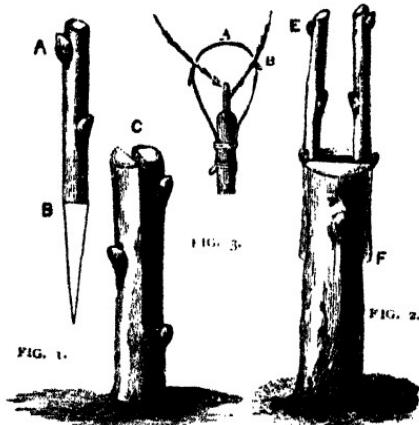
Gardening ingenuity has invented many kinds of grafting, but it will be sufficient, in separate articles to follow, to describe a few only of these processes, in order to explain their principle. The first thing to be done is to select a suitable stock, whose height will be according to the purpose for which it is intended, and also a graft, which should be from an early branch of the previous year's wood which has ripened under an August sun, so that the wood has been thoroughly constituted before the early frosts sets in. It should also be selected so that the graft is in the same state of vegetation with the intended stock. Where the texture of the wood is less advanced in the graft than in the stock, the latter intercepts the descent of the pulpy sap, and forms the bulging on the stem which is observable on many trees that have been subjected to the process of grafting. When the case is reversed, the swelling occurs in the branch above the graft; for the principle of the union is that the pulp from the scion descends to the point of junction, where, being shut in by the ball of grafting wax, which surrounds it, and thereby secluded from the light and air, it forms woody fibre in place of the roots which it would have formed in the soil; in the meanwhile, the sap from the stock rises into the graft, where it is elaborated into pulp by the action of the leaves, and returns again, but in a more consistent state. It is necessary, therefore, where the graft selected is in a more advanced state of vegetation, to detach it from the parent stem, and bury it in the ground, under a north wall, until both are in a similar state: in this position the graft will remain stationary while the stock is advancing.

CLEFT OR TONGUE GRAFTING.

In this mode of grafting, the crown of the stock is cut across, and a longitudinal wedge-shaped slit, C, as in Fig. 1, is made about 4 inches long, according to the size and

Finally, bind the whole, and cover it over, from the summit of the stock to the bottom of the cleft, with clay or grafting paste.

When two grafts are inserted in the stock, and they both take, it is necessary to suppress the least vigorous as soon as the wound is completely closed, especially in the case of standard trees; otherwise the head gets formed of two parts completely estranged from each other. During the first twelve days after the operation, protect the head from the action of the air and the heat of the sun by some kind of shade. A square piece of paper, twisted into the shape of a bag, such as grocers use for small quantities of sugar, answers very well for this purpose, protecting it at the same time from the attacks of insects. When the grafts, whether double or single, begin to grow, protect the head from being disturbed by the wind, or by birds lighting on it, by attaching it to some fixed object. A perch formed of an osier rod,



CLEFT GRAFT.
RAFT IN CLEFT
RING GROWING
S, WIND, &c.

vigour of the intended graft; this cleft is kept open by a wooden wedge until the scion is prepared. The scion is then selected, having a bud, A, at its summit; and the lower part of it is shaped with the knife so as to fit the slit in the stock. The double-tongued graft only differs from the first in having two grafts in place of one, as in Fig. 2; and it is preferable, when the size of the stock permits of its use; the wound heals more quickly, and the chances of success are greater than in the single graft. In placing the graft, it is to be observed that the top, whether single or double, should incline slightly inwards, as at E; thus leaving the lower extremity slightly projecting, as at F, in order that the inner bark of the graft and stock may be in direct contact with each other.

Having both ends tied firmly to the stock, and having the young shoot attached to it, as in Fig. 3, will serve both purposes.

When the young scion begins to grow, it is necessary to suppress all buds which develop themselves on the stem below it, beginning at the base, and advancing progressively towards the young scion, but in such a manner as not to destroy those near to it until it has thrown out branches an inch and a half or two inches long. This holds good for all kinds of grafting.

SLIT GRAFTING.

In place of the vertical cut through the whole of the stem, in this process a triangular cut is made in the side of the stock, as in the accompanying illustration; the lower end of the graft is then cut so as to fit

PROCESS OF PRUNING.

exactly into the gap made, so that the inner bark, or liber, meets in contact at all points ; this done, it is covered with clay or grafting paste, and bound up until amalgamation takes place.

PROCESS OF PRUNING.

Tools Required.—The instruments required in pruning are a hand saw, a pruning knife, a chisel, and a mallet. For garden trees the knife is the most important ; it should be strong and of the best steel, with a considerable curve, so as to take a good hold of the wood.



SLIT GRAFTING.—The way in which to perform the operation requires attention. The amputation should be made as near as possible to the bud, but without touching it ; the cut should begin on the opposite side, and on a level with its lower part, made at an angle of 45° , and terminate just above the bud, as at A in Fig. 1A, which

bud, but not so near as to injure it. The pruning knife is placed exactly opposite the bud, and cut in a slanting direction upwards, in the line ab, coming out a little above the bud. By this means the bud remains uninjured, and more readily bursts into growth when the time comes. In B, the branch is cut in the line ab too far from the bud, and the consequence is that the wood dies down to the line c, and the dead stump has to be cut away the following year. In C, the cut ab is too slanting, and commenced too far down the stem on the side opposite the bud, and the consequence is that the bud is weakened and its growth rendered less vigorous.

If it is necessary to cut away a branch altogether, a small portion of it should be left on the stem, as at a in D, and the cut should be a smooth one, slightly bevelled, presenting the smallest possible extent of wounded surface, when the healing of the wound will be quicker than it would have been had the cut been made nearer the stem. If amputation of a larger branch is made with the saw, the cut should be made smooth with the knife or chisel, and covered with grafting paste.

Formation of Head in Standard.—The first object in pruning a standard tree is the formation of its head. The first pruning must take place at the end of the first

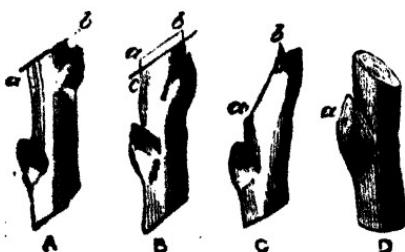


FIG. 1A.—RIGHT AND WRONG MODES OF PRUNING.

shows the right mode of cutting a branch in pruning, and which, with the accompanying illustrations at B, C, and D, is reproduced from Du Breuil's work on the culture of fruit-trees. When cut as at A, the amputation is made as close as possible to the



FIG. 2.—FIRST YEAR'S PRUNING OF STANDARD.

season after grafting, when the scion has made its growth, as represented in Fig. 2,

and when two shoots have sprung from the graft. To form a full round head, the two shoots should be pruned into *a, a*. The year after, the tree will present the appearance represented in Fig. 3 : or, if three shoots have been left the first year, and the whole three headed in, in the following year they will appear as in Fig. 4, each shoot having thrown out two new branches.

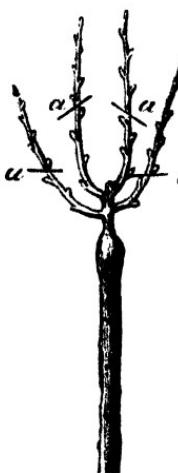


FIG. 3.—SECOND YEAR'S PRUNING OF STANDARD WITH TWO SHOOTS.

The one tree now presents a head of six, and the other four shoots. At the end of second year both are to be headed back, the one to the shape indicated by the crossing lines *a, a, a, a*, the other as nearly as possible to the same distance from the graft.

Another year's growth will, in each instance, double the number of main shoots, which will now be eight and twelve respectively. If a greater number of shoots appear, or if any of them seem badly placed, their growth should be prevented by pinching off the tops when young, and pruning them clean off when the tree has shed its leaves. The time for winter pruning is between

November and February, before the sap begins to stir. Those trees which have produced twelve shoots should be pruned exactly like those with eight, to form a compact head. When the standard tree has acquired eight or twelve main branches, as the case may be, by these various prunings, it has attained its full formation, as represented in Fig. 5, where the eight branches have assumed a circular, cup-like form. For a few years the growth of these eight branches should be carefully watched, and each kept as nearly as possible in an equally vigorous state. Should any of them take the lead of the others, so as to



FIG. 4.—SECOND YEAR'S PRUNING OF STANDARD WITH THREE SHOOTS.

threaten the symmetry of the tree, its extremity should be nipped off in such a manner as to check its growth, and at the winter pruning it should be shortened in

PROCESS OF PRUNING.

considerably. All shoots from the stem below the grafts should be rubbed off as soon as they appear.

When the standard tree has reached its



FIG. 5.—APPEARANCE OF STANDARD IN THIRD YEAR'S GROWTH.

bearing state, the object of the pruner is the production of fruit, which is best attained by giving a round and cup-like form to the tree. If the branches are too vigorously shortened, strong useless wood will be produced, without fruiting spurs. If the branches are well placed, let them have their free course, and they will throw out bearing spurs to the extremity of the branches. Little more need be said on the subject, except that all unproductive wood, crowded sprays, and decayed branches, that cross each other, should be cut out, the tree kept open in the centre, and the open cuplike form rigorously

maintained. These remarks apply chiefly to apples, pears, and other trees which bear their fruit on spurs. These spurs will in time become long and scrubby, with many branches, as in Fig. 6, in which a spur is shown which has grown beyond due limits: No fruit spur should be allowed to grow beyond 2 inches in length, and to bring back the spur in Fig. 6 to its proper position, cut away neatly the upper shoot at A, when the small buds d, d, will push out and form blossom buds the following year.

Breaking Young Shoots.—When a tree is very vigorous, the buds will break strongly and run into wood too strong to form blossom buds. The remedy in this case is to break the young shoot near the third bud from the main branch, leaving the broken part hanging down. The time for this operation is about the middle of March. The broken part, while it droops, nevertheless draws up a portion of the wood sap. The following winter, when the buds are turned into blossom buds and become fruitful, the hanging shoot should



FRUIT SPUR TOO LONG AND WITH TOO MANY BRANCHES.

be neatly pruned away, when a fruitful bearing spur will be formed. But this brings us to the consideration of pinching and twisting shoots for the production of fruit spurs, for which see *Pinching, Rationale and Mode of.*

PRUNING TREES.

The principles of physiology, as relating to trees generally, are applied to the pruning of fruit-trees, with the following results :—

1. It imposes on the tree a form in keeping with the place it is intended to occupy.
2. It leads to the principal branches of the tree being furnished with fruiting branches in all its extent.
3. It renders the fructification more equal, by suppressing superabundant flower buds, and encouraging new ones for the following year.
4. It determines the production of larger fruit, and of better quality, by regulating the supply of nourishment to the fruit-bearing branches.

In fruit-trees in a state of nature the sap is distributed equally, because the tree follows its natural tendency, which is to develop perpendicular branches ; and as the tendency of the sap is to ascend to the loftier branches, the ramifications of the base of the stem come to languish, and finally dry up altogether into hard wood ; it is, therefore, indispensable to the production of fruit to overcome this natural tendency of the sap. Let us imagine an espalier-trained tree in which the equilibrium of vegetation is broken. We know that the sap is attracted by the leaves, and that by suppressing a sufficient number of the leaf buds upon the branches, growing with superfluous vigour, the sap flowing into them will be diminished, and an increased quantity will fall to the weaker branches, whose leaves are kept untouched ; therefore suppress, as early as possible, all useless buds on strong branches, and retain them as long as possible on weak ones.

The sap acts with greatest force upon the shoots thrown out by vertical branches ; weak branches will be assisted, therefore, by being placed in a vertical position, and

strong ones repressed by being trained horizontally, or by having their extremities arched downwards.

In removing the leaves from a strong shoot, in order to restore the balance to a weak one, it is necessary to remember that without a due proportion of leaves to attract and elaborate the sap, the branch will perish ; the leaves removed, therefore, must be sufficient to restore the equilibrium, and no more ; and they must be removed in such a manner as to preserve the petiole, or leaf stalk, on the branch.

Fruit has the property of attracting sap, and elaborating it for its increase ; and it follows that a superabundance of sap will be drawn to the stronger branches. Leave all the fruit possible on the strong, and suppress them upon the weaker branches.

A solution of sulphate of iron, in the proportion of one grain to a pint of water, applied after sunset to the green leaves and leaf buds of weak branches, is rapidly absorbed by the leaves, and powerfully stimulates their action upon the ascending root sap of fruit-trees.

By detaching weak branches from the wall or espalier to which they are fixed, they receive an increased amount of light and air on both sides. As light is the chief agent employed in the elaboration of the sap, its energy will thus be largely increased. But this must not be done until the end of May, when any danger from frosts may be considered as past. The same result is obtained by covering the stronger branches from the light.

The sap develops itself much more vigorously under short pruning than under long branches. If, then, it is desired to obtain wood branches, prune short : when the branches are vigorous they develop few flower buds. On the contrary, if it is desired to develop fruit-bearing branches, prune long ; the less vigorous branches develop abundance of flower buds. Another

WINTER PRUNING.

application of this principle, to re-establish the vigour of a tree exhausted by heavy crop, is to prune it short the following year. This may appear to be a contradiction of a maxim previously laid down, to prune short an over-vigorous branch and leave the weak ones long. The contradiction is only apparent : the one applies to a whole tree, which is to be treated alike in all its parts ; the other to a tree whose equilibrium is to be restored—the one to the production of wood, the other of fruit.

The tendency of sap to flow to the extremity of the branch leads to a more vigorous development of the terminal bud than of the lateral buds ; accordingly, where it is desired to obtain an elongation of the branch, it is necessary to prune back to a vigorous wood bud, and to leave none beyond it which can interfere with the action of the sap.

The more the sap is retarded in its circulation, the smaller is the force with which it acts in developing branches, and the greater in action in producing flower buds. Trees only begin to develop flower buds when they have reached some maturity, for it is necessary for the production of flower buds that the sap should have attained some consistency, and circulate slowly. This elaboration is assisted by the extended course it has to run in the lengthened branches ; it is also assisted by broken and interrupted lines. This well-known principle has been taken advantage of to check the sap by pinching and torsion, and even partially breaking over-vigorous branches. These mutilations have been found to diminish the vigour of the shoots and branches, by forcing the sap into new branches while the older branches are elaborating their fruit buds.

WINTER PRUNING.

The process of pruning fruit-trees is per-

formed at two seasons—winter and summer. Winter pruning should be performed while vegetation is entirely at rest—the period which follows the severest frosts, and which precedes the first movement of vegetation—that is to say, the end of February or the very beginning of March in ordinary years. If trees are pruned before the strong frosts of winter set in, the cut part is exposed to the influence of the severe weather long before the first movement of the sap takes place which is so necessary to cicatrize the wound, and the terminal bud is consequently often destroyed. Equally troublesome are the wounds made during frosts : the frozen wood is cut with difficulty ; sometimes the cut is ragged, and they do not heal ; mortality attacks the bud, and it disappears. To prune after vegetation has commenced, except where summer pruning is to be pursued, is not to be thought of ; therefore, let it be done in February, if the frost has disappeared, more especially for the peach, whose buds, placed at the base of last year's shoots, are particularly exposed to the action of the ascending sap. Summer pruning will be best treated of under the particular species, each of which require to be attended to at different periods.

STANDARD FORM FOR FRUIT-TREES.

This form is best adapted for orchards and for fruit-trees in isolated positions, hedges, &c., in which fruit-trees ought to be found far more frequently than they are, and doubtless would be if the eighth commandment were more generally respected, and the law of trespass more rigidly enforced. The standard form of growth, which is the most natural form, is too well known to need further explanation, and the process of pruning necessary to control and induce this growth in its best form has been explained in *Process of Pruning*, which see.

TREES, TRAINING ON CORDON SYSTEM.

Cordon System for Fruit-trees.—This system of growing and training trees on supports is applicable to the apple in open ground, and to pears, peaches, nectarines, apricots, plums, and cherries on walls or wires. When a tree is said to be trained on the cordon system, it means that its growth is restricted to the stem only and the fruit spurs which issue from it, or to two branches, which leave the stem at a short distance above the ground, and are trained in directly opposite directions or in parallel lines. The cordon assumes three directions—the horizontal, the vertical or upright cordon, and the oblique cordon, which is mostly grown at an inclination of 45° to the ground level. When a wall is covered with cordon trees, the trees are

most generally adopted is that of the horizontal cordon, in which it is used as an edging for borders, being grown about 12 inches from the artificial edging of the border or piece of ground. Strawberries, however, may line the edge, and the apples be put a little further back. Posts must be set in the ground at either end of the line that the cordon is to take, and intermediate posts set between them at the distance of about 12 feet apart from post to post. Galvanised iron wire is then strained from end post to end post—as shown in Fig. 1, which shows the appearance of the tree in winter—and supported by or fastened to the intermediate posts.

ESPALIER TRAINING.

Fruit-trees of almost all kinds—espe-

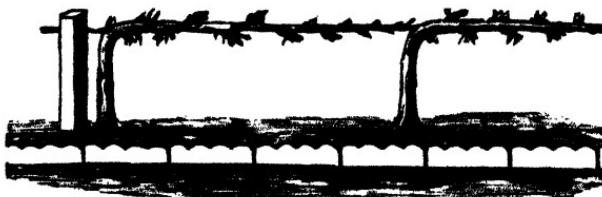


FIG. 1.—LOW CORDON FOR EDGING OF BORDER IN WINTER.

planted about 18 inches apart, and the stems are trained in parallel lines. By a judicious system of pruning, based on the mode already described under "Pruning," the growth of lateral branches is prevented, and the formation of fruit spurs promoted. The utility of this mode of training rests on the fact that the wall is more quickly covered by the growth of many trees than by that of one, and that the fruit-producing power of a tree is concentrated and focussed as it were far more effectually in a small tree than in a large one.

Cordon System, Horizontal, for Apples.—It has been said that the apple is the only kind of fruit-tree that is grown as a cordon in the open, and that the form

ally apples, pears, &c.—may be trained on the espalier system—that is to say, on a row of vertical stakes—or on trellis. In some situations this kind of training is not only extremely neat, but possesses peculiar advantages. The trees are more fully exposed to the influence of light and air, and in small gardens it is useful on account of the little space which the trees occupy, and because they will bear fruit earlier than when left as standards. The training of espalier is very simple. When the trees are young, one shoot must be trained perpendicularly and two others horizontally, one on each side; the two last must not be shortened, but the perpendicular shoot is to be shortened in the following year to

FAN OR PALMETTE TRAINING.

three good buds; two of which are to form new side branches, and the other a leader as before, and so on every year, till the trees have attained the desired size: from 6 inches to 9 inches is about the proper distance between the horizontal branches. Trellises are best made of wood (iron causes canker in the trees), and young larch—the thinnings of the plantation—is the best wood for the purpose.

The espalier system is one of the best that can be adopted for gooseberries, because the fruit on trees grown in this manner is better exposed to the influences of light and air than when grown on bushes, and can be manipulated and thinned all the more easily by picking in a green state. The mode of training is very easy but somewhat different to that adopted in the case of fruit trees. Rough stakes are driven into the ground at the distance of about 3 inches or 4 inches apart, and connected at top with a capping of the same. Two lateral branches are then led from the main stem, one in one direction, and the other in the opposite direction. From these laterals, which should be close to the ground, branches are led upwards vertically, a branch on each stake. Gooseberries and currants, trained on this principle, should be planted about 4 feet to 5 feet apart, and lateral boughs first trained along the bottom in each direction, from which vertical boughs should be carried up the stakes from the laterals. Far finer fruit can be produced in this manner than on the bush system, and it is a more handy way of bordering pieces of garden ground than by apple and pear-trees.

FAN OR PALMETTE TRAINING.

This system of training is the form most commonly exhibited on garden walls, on wires strained on posts, and on rows of stakes in the same straight line, usually spoken of in this country as espaliers,

although this term is applied by the French to trees trained on any plain surface, whether it be solid, as in the case of the wall, or a skeleton surface only, as with strained wires and stakes in rows. After the pyramid form, there is no better mode of training apples in gardens, as the apple-tree is usually impatient of training against a wall. The stakes, whether rough from the coppice or hedgerow, with the bark on, or of timber 1 inch square, well planed up and painted, are driven into the ground at equal distances, and capped or not &c.

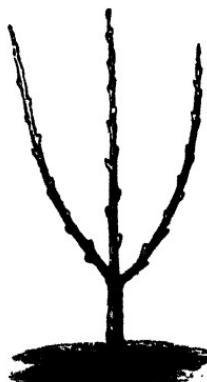


FIG. 1.—PALMETTE OR FAN BEFORE COMMENCEMENT OF TRAINING.

pleasure by a horizontal rail at the top to steady them. The tree is planted in the centre of the space allotted to it, and it is then trained in the way about to be described, so that lateral branches may be induced to run at regular intervals in horizontal lines at right angles to the stem. The same style of horizontal training is often adapted for pear-trees on walls and on the sides of buildings.

In the Palmette or Fan system, whatever may be the direction that the branches are ultimately compelled to assume, the system of training to be carried out in the

infancy of the tree, so to speak, is the same. The tree is subjected to this training when it has attained a central stem and two lateral branches, as in Fig. 1. In

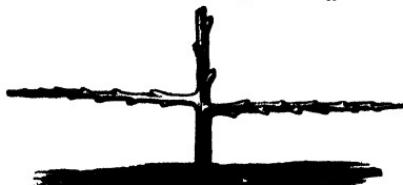


FIG. 2.—FIRST PRUNING OF PALMETTE OR FAN.

the autumn or winter pruning of the following year, the two side branches are trained horizontally, as in Fig. 2, and pruned back to about two-thirds of their length, with a bud immediately below the cut. The stem itself is pruned back to about 18 inches above the side branches, taking care that there are three buds immediately below the cut—one on each side, well placed, and a third in front to continue the stem. With the fall or the leaf in the following year the tree will be as represented in Fig. 3, with two horizontal shoots, a central stem, and two other untrained side shoots. When the pruning season arrives, the same process of cutting back takes place, each of the new side shoots being cut back to two-thirds of its length, the two lower branches to two-thirds of the year's growth, and the stem to within 18 inches of the second pair of laterals, leaving three well-placed buds immediately below, as before, to continue a third pair of side branches and the stem. It will be seen at once that this is the treatment required to induce the horizontal growth for apples and pears for walls and espaliers, as shown in Fig. 4, while Fig. 2 represents the commencement of a tree trained on the fan system, with this exception, that the lowermost branches on each side should have a direction slightly inclined to the stem, and not perfectly

TRAINING ON FAN SYSTEM FOR PEACHES, &c.

Enough has been said in the directions given elsewhere for the pruning and training of pears and apples to guide the gardener in work of this kind when carried out on other kinds of fruit-trees, but it will be necessary to make a few brief remarks on the treatment required by trees that bear stone fruit and not pip fruit, as apple-trees and pear-trees do. Peaches and nectarines, to be brought to perfection in this country in the open air, require walls with a southern aspect, or south with a slight turn east or west. The trees that bear them are obtained by budding on a plum stock, that of the muscle plum being the most suitable for the purpose. They may be trained in the fan or inclined cordon form, but the main branches must be disposed in such a manner and at such a distance apart as to leave room for lateral shoots to be laid in on each side of the main branch, because it is on the new or young wood that the fruit is produced, and not on permanent fruit spurs as in the pear and apple. Thus, although the branches of a trained pear or apple need not be more than 12 inches



FIG. 3.—PALMETTE IN SECOND YEAR

apart, the branches of a peach or nectarine must be from 20 to 24 inches apart in order to give room for laying in the lateral fruit-bearing shoots that proceed from the

main or wood branch. For the same reason, although pears in the oblique cordon form may be planted 16 inches apart, so that their branches when inclined

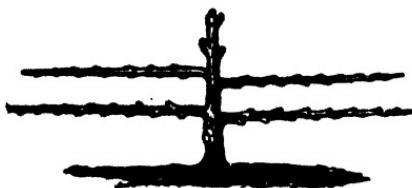


FIG. 4.—PRUNING OF PALMETTE IN SECOND YEAR.

are about 12 inches apart, yet the trees in a row of oblique cordon peaches must be planted from 24 to 30 inches apart in order that there may be an interval of from 20 to 24 inches between them when inclined.

That there may be no misconception of that which has just been said, the accompanying illustration will give a rough idea of the training of the peach and nectarine in fan form, the tree being represented in the form that it assumes in the fifth year of its training and the sixth year of its growth after planting, for peaches and nectarines should not be pruned during the first year of their growth. At the end of the first year the tree should be cut back to about 18 inches, or even less, from the ground, in such a way as to leave three buds on the stem—two on opposite sides of the stem, about 12 inches above the ground level, and one in front: from the side buds

the branches A, A, are obtained, while the front bud affords the continuation of the stem. The second year the new shoots that spring from the three buds must be cut back about a third of their length,

and at the third pruning the main stem is again cut back in order to allow the lowest branches, A, A, to gain in size and strength and to develop lateral shoots. It is not till the fourth year that the branches B, B, are allowed to grow. In the fifth year the upper branches, C, C, are developed from buds left below the point at which the stem has been last cut, and at the end of the summer the growth of the tree is as shown in the illustration herewith. In the meantime, the side branches and the lateral fruit-bearing

in order to secure the proper extension of both. In the peach and nectarine the fruit branches—they can scarcely be termed spurs—are new every year; that is to say, the branches which have borne blossom and fruit one year, and will bear no more, must be replaced the next year by fresh branches from new buds at the base of the shoot.

All that has been said above with reference to the peach and nectarine applies equally well to the apricot, which is also budded on a plum stock. It requires a



PEACH-TREE TRAINED ON FAN SYSTEM.

warm and sheltered situation, and in this country must be grown against a wall whose aspect may be towards any point of the compass between south and east or south and west.

In this, the sixth and last portion of this Section, are included a few operations and instructions in Gardening that could not well be placed in any of the preceding parts. Prominence here must be assigned to

GARDENING FOR SMOKY CITIES AND LARGE TOWNS.

It is well known to every one that smoke, is very prejudicial to vegetable life. Without taking into consideration the deadly effects arising from the diffusion of smoke generated in certain factories—more especially chemical works—which is fatal in proportion to the nature of the substances employed, and from which the smoke is evolved, it is sufficient for the gardener to have to combat smoke arising from ordinary coal-furnaces and the thousands of chimneys for domestic use which surmount our crowded dwellings. Smoke of this sort is generally considered to consist of two parts—gaseous exhalations and certain minute particles of carbonaceous matter called soot. Both these constituents are capable of producing more or less injury to the bark, leaves, and blossoms of whatever trees, shrubs, and plants are brought into contact with them. Soot, applied as a manure to the soil, is a decided fertiliser, or perhaps it would be more correct to call it a stimulant to vegetation; but this is a very different application of soot from that with which vegetation is treated, when it is found struggling for existence against the dense masses of soot which are emitted from the chimneys of our populous cities and large towns. The gaseous vapours charged with soot form a black gummy coating over the stems and leaves, which prevents the respiratory organs of plants from performing their proper functions for the support of life. Of course it would be as useless as it would be foolish, under such unfavourable circumstances, to attempt the cultivation of all sorts of shrubs and plants indiscriminately; but it should be a matter of thankfulness that some sorts will

grow, and that experience has pointed out those which will flourish and do best. It is necessary, therefore, to know what trees, plants, and flowers flourish best; and such knowledge, to begin with, will be the means of saving much trouble, disappointment, and expense.

Some persons, perhaps, may imagine that outdoor gardening under such adverse circumstances can hardly repay the trouble that must be bestowed upon it, and that the subject loses its interest because there are not many persons who have much opportunity or convenience for availing themselves of it, so small a space in general being allotted in most cities and large towns to each house beyond the plot of ground which it actually stands upon. But why should even the smallest court-yard not be turned to the best account? Why should any open space be deprived of a green tree, a few shrubs and plants and flowers, to ornament it? Why should the back drawing-room, as is so often the case even in good houses, have nothing better to look out upon than bare walls and a dirty pavement? It should be observed that turf grows well under the influence of smoke, that trellis-work will hide any unsightly object, and the large quick-growing Irish Ivy (*Hedera Canariensis*) will soon cover a wall; a light verandah, also, at the drawing-room windows may be made available for creepers. The common nasturtium will do well, and so will the different varieties of tropaeolum, also *Tropaeolum Canarienses*; but care must be taken that they do not suffer from drought, for drought in a smoky atmosphere is far more injurious to plants than it is where the air is clear and pure.

The following list will be found to con-

tain most of the trees, shrubs, herbaceous plants, and annuals, at present introduced into this country, which are not so susceptible of the injurious influences of a vitiated atmosphere as many others, and which are consequently suitable for our cities and large towns :—

- Acer pseudo-platanus*, or Sycamore.
" *rubrum*, or Swamp Maple.
- Achillea millefolium*.
- Aucuba japonica*.
- Bucellaria hippocastanum*, or Horse Chestnut.
- Ageratum*.
- Alyssum*.
- Amelanchier alnifolia*, or Virginian Creeper.
- Amygdalus communis*, or Sweet Almond.
- Antirrhinum majus*, or Snapdragon.
- Aristolochia Macqui*.
- Artemisia abrotanum*, or Southernwood.
- Aster*, varieties of.
- Betula alba*, or Common White Birch.
- Bignonia radicans*.
- Calceolaria*.
- Carnations.
- Chrysanthemum*, all varieties of.
- Clematis flammula*.
" *montana*.
" *vitalba*, or Traveller's Joy.
- Cornus mascula*, or Cornel.
" *sanguinea*.
- Crataegus oxyacantha*, or Common Hawthorn, and varieties.
- Crocus*.
- Cytisus laburnum*, or Common Laburnum.
" *alpinus*, or Scotch Laburnum.
" *scoparius*, or Common Broom.
- Dahlia*.
- Daisies.
- Daphne Me瑟eum*.
- Dracocephalum*.
- Enonymus Europaeus*, or Spindle Tree.
- Ephedra angustifolium*, or Willow Herb.
- Fagus sylvatica*, or Common Beech.
- Foxglove*.
- Fraxinus*, or Ash, all varieties of.
- Genista* or Sweet Almond.
- German Stocks.
- Gladiolus*.
- Heartsease.
- Hedera Helix*, or Common Ivy, and varieties.
- Helleborus niger*, or Christmas Rose.
- Hollyhocks.
- Hypericum calycinum*, or St. John's Wort, large variety.
- Hypericum elatum*.
- Ilex aquifolium*, or Holly, and varieties.
- Jasminum officinale*, or Common Jasmine.
- Juglans regia*, or Walnut.
- Lavender.
- Lily of the Valley.
- Lycium Barbarum*, or Box Thorn.
- Magnolia grandiflora*.
" *conspicua*.
" *glauca*.
- Mahonia aquifolium*, or prickly-leaved Barberry or Berbera.

- Mespilus Germanica*, or Common Medlar.
- Mignonette.
- Mimulus.
- Norus nigra*, or Common Black Mulberry.
- Negundo fraxinifolium*, or Ash-leaved Maple.
- Phillyrea grandiflora*, or Syringa.
- Phillyrea, all varieties.
- Phlomis fruticosa*, or Jerusalem Sage.
- Pioxes, all hardy varieties.
- Pinks.
- Polyanthus*.
- Populus fastigata*, or Lombardy Poplars.
- " *nigra*, or Black Poplar.
- Pyrus aucuparia*, or Mountain Ash.
- Rhamnus alaternus*, or Buckthorn.
- Rhododendron ponticum*.
- Rhus typhina*, or Fever Sumach.
- " *cotinus*, or Wild Olive.
- Robinia pseud-acacia*, or Common Acacia.
- Rockets.
- Roses—Maiden's Blush.
" Provence.
" Rose de Meaux.
- Rubus*, or Bramble, varieties of.
- Salix*, or Willow, varieties of.
- Sambucus nigra*, or Elder.
- Santolina chamae-cyparissus*, or Ground Cypress.
- Scarlet geraniums.
- Snowdrop.
- Sophora Japonica*.
- Spartium junceum*, or Spanish Broom.
- Staphylea trifolia*, or Bladder Nut.
" *pinnata*.
- Sunflower.
- Sweetwilliams.
- Symporicarpus racemosus*.
- Syringa, all varieties.
- Taxus baccata*, or Common Yew.
" fastigiata.
- Thuja occidentalis*, or American Arbor Vitæ.
orientalis, or Chinese Arbor Vitæ.
- Tulips, all sorts.
- Ulmus*, or Elm, all sorts.
- Verbenas, varieties.
- Viburnum opulus*, or Guelder Rose.
- Vinca major*, or Periwinkle.
- Virginian Stock.
- Wallflowers.
- Wistaria sinensis*.
- And most of the common hardy annuals.

The above list is sufficient for every purpose of ornament and brightness of appearance. In so long a list it must be obvious that some things will do better than others ; but all are worth planting, as all have been known to live in a smoky atmosphere. Of trees, the plane, which sheds its bark annually, and the poplar in its different varieties, are decidedly the best where the air is most charged with soot.

Besides chrysanthemums, a very fair

display may be obtained throughout the three or four plants in No. 48 pots, in a year of other hardy flowers which will compost of loam and a little rotten dung, thrive in London smoke, and may be taking care that they do not get too much grown with success in most of the squares and small gardens in large cities and towns. As a winter flower, the Christmas rose (*Helleborus niger*) does very well. Snowdrops, too, bloom very freely. Next comes the crocus and tulips, of different colours: these do remarkably well, and if planted in October, in beds or good-sized patches, will, in March or April, make quite a show, and form a pleasing mixture with the common primrose.

In the middle of February sow round the crocuses a good quantity of Virginian stock, purple and white alternately; the leaf of the crocus shelters the young stock from the frost and cold March winds; and when the crocus has done blooming, either cut the leaves off or twist them round, and give them a tie to allow the Virginian stock fair play. This comes in succession to the crocus, and when sown in large patches in beds has a very pretty effect. The gladiolus is a very excellent bulb for town borders, if planted in March in a strong room, leaf-mould, and rotten dung, and plenty of water when the hot weather sets in. The daffodil and narcissus do very well. Next come the white candytuft and the yellow alyssum, which bloom at the same time. These strike from cuttings in the summer, and keep in a cold frame all the winter. Next comes the *Iris Germanica* and the rocket. Daisies and heartsease do well, and flower a long time. The calceolaria does exceedingly well, and flowers all the summer. Cuttings of these should be put in a cold frame in October, and merely require the frost to be kept from them. Peg them down like verbenas, instead of stopping them. Intermediate stocks do a very well, and flower all the summer: grow anywhere. Mignonette does well. Sow these in September, under a hand-glass. When old enough, prick out a little heat in 48-pots, in light mould to

The dark clove-carnation is very hardy and flowers beautifully. The sweetwilliam, lupinus, polyphyllus, scabiosa, antirrhinum, polyanthus, foxglove, and lily of the valley do remarkably well. The fuchsia, if planted in a cold shady place in summer, flowers tolerably well, but must be attended to in watering, or the flower drops before opening. Plant them in leaf-mould, rotten dung, and yellow loam. If the weather is very hot and dry, cover the surface with a little rough rotten dung. The mimulus is a famous town flower, but requires plenty of water. Some of the hardy phloxes do pretty well. The double rocket flowers freely, and if the first bloom is taken off when faded, the plant will bloom again as freely as ever; but it requires a great deal of water. Nearly all the common hardy annuals may be recommended, especially branching larkspur, the *Phlox Drummondii*, lupinus, coreopsis, &c. Balsams do very well if the seed is sown in a little hotbed. Have nothing to do with tender annuals: they are poor, sickly-looking plants for town gardening. The common pinks do exceedingly well. The willow-herb (*Epilobium angustifolium*) is

turn out. There are numbers of herbaceous plants that do very well, such as the Michaelmas daisy (*aster*), double sun-flower, *Achillea ligulata*, *Dracocephalum speciosum*, sea-lavender (*Statice latifolia*), and all hardy plants of this class. The common English ferns thrive very well in shady parts, by watering every day in hot, dry weather. Plant them in leaf mould, loam, and common sand, and mix with them a few plants of periwinkle and some rock-work ; but be careful not to disturb them while forking up the borders. Holly-hocks do very indifferently, and are not worth trying. Dahlias do exceedingly well if well supplied with water, and carefully thinned as they advance in size. They ought to be planted very early in the spring to get an early bloom ; as they are not required in September, the chrysanthemum taking their place.

But few shrubs and deciduous plants do any good. The lilac blooms very scantily, but does well for a screen, as it shows a little green in the summer. The *Aucuba Japonica* answers in sheltered places. The euonymus does very well in smoke, and retains its foliage. The box, holly, and privet thrive for two or three years ; rhododendrons flower freely for a season, with plenty of water, all through the summer. The hibiscus rose, or *Althea frutescens*, grows and flowers remarkably well. The *Daphne Mezereum* does well, and flowers freely, both white and pink. The dwarf roses, such as *Rose de Meux*, Cabbage, Provence, Maiden's Blush, York and Lancaster, do tolerably well.

As respects forest-trees nothing does so well as the oriental plane, in consequence of its shedding its bark every spring ; by so doing, it gets rid of the soot, which sticks to other trees like varnish, and which there is no getting off. Lime-trees do very badly ; but the elm and thorn tolerably well. The Lombardy poplar is a

capital tree for London. Irish ivy does very well where you want to cover a wall. Turf stands smoke as well as anything, and when the situation is open, looks remarkably well.

Copious watering must be insisted on, and it must be remembered that deep digging and plentiful manuring are not less essential in the sooty atmosphere of crowded towns. Every year the collected surface-soot should be buried by trenching about 18 inches deep, and a good dressing of manure be worked in to renovate the soil.

HOW TO MAKE HOTBEDS.

There is no fixed rule as to the best time for making hotbeds : they may be made, indeed, at any time of year, and for any purpose for which they may be required. For example, if it is desired to have cucumbers at Christmas, the bed must be made early in October ; if in January, early in November ; and so on in proportion, little less than three months being required from the time of planting to the time of ripening fruit at this time of the year. It is immaterial what time of the year is chosen to commence cucumber growing, the only difference being that in the spring and summer months the task is comparatively easy, requiring less labour and less material than in the winter. In the colder months the weather has to be battled with ; in the warmer months the weather in a great measure assists. Supposing it is desired to commence in October, let a quantity of stable dung be got together, proportioned to the size of the frame : two double loads for a three-light frame are usually allowed for the body of the beds ; but it is as well to add an additional load, in which to start the plants. Having shaken it all together, laid it out for a week, and then turned it over again, take rather less than one load and make a bed for a one-light frame. This

may be put together roughly, as it is merely to raise the plants in, and may be pulled to pieces when that is accomplished.

The remainder of the dung should be turned over four or five times during a fortnight, and wetted, if dry. This preparation is most important; the inexperienced operator, unless he would run the risk of destroying his plants at the beginning, should follow it to the letter; for, unless the material has been well worked before the bed is made, it is apt to heat too violently, and burn the roots of the plants. In order to avoid this, it is advisable to use an equal quantity of leaves mixed with stable dung for the bed; the leaves give a sweeter and more moderate, as well as more lasting heat. When the material is ready, measure the frame, length and breadth, and mark out the bed, allowing 1 foot or 18 inches more each way for the bed than the length and breadth of the frame. At each corner of the bed drive a stake firmly into the ground, and perfectly upright, to serve as a guide to build the bed by. Then proceed to build up the bed, shaking up the dung well, and beating it down with a fork. The whole should be equally firm and compact, so that it is not likely to settle more in one part than in another, the surface being quite level. The frame and lights may now be placed in the centre, but the lights left off, so that the rank steam which always rises from a newly made hotbed may escape.

Putting on Soil.—When the bed is made, the frame and lights put on, and the rank steam passed off, which generally takes five or six days, let a barrowful of good loamy soil be placed under each light; by the next day this will be warmed to the temperature of the hotbed, and the plants may be planted in it; no matter how small the plants are, it is better than raising them in the bed in which they are

to grow, the shift itself being beneficial, and the time saved being rather more than a fortnight.

Making Seedbed.—When the dung has lain the first week, the seedbed is made. In three days the rank steam has passed off. A few pots with soil are then put in the frames. The next day the seed may be sown in these, two in each pot; in three days the plants will be up. They need not be re-potted or disturbed, but grown as they are; and, when the principal bed is ready, turned out of the pots with a ball of earth, and sunk in the new soil an inch or so over the ball of earth. If the bed now gives a moderate heat of 75° to 80° , and a sweet steam pervades the inside of the frame, the plants will soon root into the new soil, and grow very fast. Care must be taken, however, that the humidity is not too great, or that, in allowing some of it to escape, cold winds are not allowed to enter; an excellent preventive being to stretch a piece of fine netting or gauze over the opening.

Covering Hotbeds with Lights.—In covering the lights of a hotbed during frosts or rough winds, it is advisable to avoid letting the mats, or what not, hang over the sides, as there is often danger of conducting rank steam from the linings into the frame. Straw hurdles which exactly fit the lights are better than mats. The covering should be used just sufficiently to protect the plants from frost or cutting winds, without keeping them dark and close.

Linings.—The heat of the manure is not lasting; consequently the bed will require watching. It is advisable to have a thermometer in the frame, and as soon as the heat gets below 70° , apply a lining of fresh dung, which has been prepared as before, to the front and one side of the bed; and when this again declines, add another to the back and the other side. The bed can

FRAMES FOR GARDEN.

be kept at a growing heat for any length of time by this means, removing, at first, the old linings, and replacing them by fresh; but after a time, the roots will penetrate the linings, when they must not be disturbed; fresh dung must then be added to them.

ECONOMICAL MODE OF MAKING HOTBED.

The directions given under the heading *How to Make Hotbed*, for the preparation of the material and making the hotbed apply to all such, whatever the size, thickness, or purpose; consequently it will be unnecessary to repeat them; but there are other modes of making hotbeds. One is sometimes adopted which is very effec-

and the first emanations of steam are allowed to escape, is the same for a bed made on this principle as for any other.

FRAMES FOR GARDEN.

Long Frame.—This is a glazed structure of moderate height, and of length and breadth generally regulated by the purpose to which it is put. It will be convenient to regard the garden frame as altogether a structure movable at pleasure, and to dissociate it from the immovable forcing pit, whose sides, as it has been already explained, are of brick surmounted by a coping of wood, whereon rest movable lights, precisely similar to those that are used for the wooden garden frame. Long ranges in frame fashion, as shown in Fig. 1, which



FIG. 1.—LONG FRAME OR PROTECTOR, WITH RANGE OF SMALL LIGHTS ON TOP.

tive, while it greatly economises the manure. The trimmings and prunings of trees are tied up into faggots, and with these the walls of a pit are built, the exact size of the frame: on this the frame rests. The faggots are fixed by means of stakes driven through them into the ground, the walls being four feet high. After the frame is put on, the mixture of dung and leaves is thrown in and well beaten down; but the job of building a hotbed is dispensed with. The dung is piled nearly up to the glass to allow for sinking; otherwise, the management is the same as for an ordinary bed. The advantages of this plan are, first, it requires a trifle less manure; secondly, the heat from the linings penetrates through the faggots under the bed, and is found more effective. The treatment after the frame and lights are put on,

must be regarded rather as protectors than as structures in which heat is maintained, may be made in any convenient position and in a sunny aspect by means of boards at front and back placed end to end, those in the rear being wider than those in front, so that the lights may slant from back to front, and closed by boards at each end, the boards being steadied and kept in position by stakes driven in on both sides of them, or, if greater neatness be sought after, by stakes rectangular in form, about 3 inches wide and 1 inch thick, sharpened to a point at the lower end to enter the soil, and screwed to the boards either inside or outside. The frame thus made is then covered in with a row of small lights, say 4 feet long by 3 feet broad, placed side by side, and resting, one end on the board at back and the other end on the board in

front. A structure of this kind may be considerably strengthened by nailing strips of wood between each frame from back board to front board, and then by screwing a broader strip to these *underneath*, so as to form a rebate on each side of them, facility may be given for sliding the frames up and down, otherwise ventilation must be effected by raising the frames either in front or at the back, propping them up by supports cut step fashion, as in Fig. 2, so that more or less space may be given for the entrance of air according to the state of the weather. Lights for such a frame as this may be glazed or covered with oiled calico, or even with oiled paper. Such appliances as these are used in market gardens, and by reason of their simplicity and cheapness, and the ease with which they are put up and dismantled, will be found of much use in private gardens for raising and protecting early crops in a warm aspect in the spring, and for obtaining and saving lettuces, &c., throughout the winter.

Ordinary Two-light Frame.—The principle of the garden frame is set forth in the description of the Long Garden Frame or Protector, and from this it may be seen



FIG. 2.—SUPPORT FOR LIGHT.

that the frame itself, be it of what size it may, is always made in the same stereotyped manner, so to speak—that is to say, the front is higher than the back, and the sides are cut so as to slope or slant from back to front in accordance with the relative height of these parts. A good proportion for the relative heights of back and front is 3 parts for the former to 2 parts for the latter—that is to say, if the front board be 12 inches high the back should be 18 inches, or if the front be 18 inches high the back should be 27 inches. These are the heights at which the back and front parts of a

garden frame are usually made, their lengths varying according to the number of lights with which the frame is covered; and as garden lights, as a general rule, are 6 feet by 4 feet, so a frame will be 6 feet by 4 feet, 6 feet by 8 feet, or 6 feet by 12 feet, according as it is made to be covered by one, two, or three lights. The best way of making a frame is to construct the sides with tenons of some length, that pass through mortices cut for their reception in the ends of the front and back, as shown in the illustration given in Fig. 3, which affords a correct representation of a two-light garden frame, in accordance with the directions given above. In this, A and B represent respectively the front and back, and C the side nearest to the spectator. The mortices, tenons, and pegs by which these parts of the structure are connected and held together are shown at D, E. Ledges, lettered F, G, are screwed on to the outside of the sides, and front and back are further connected by a slip of wood, H, which should be rebated on each side, or on which a slip should be nailed down its centre lengthways to form a rebate, in order to supply a bearing in which the inner edge of each light may slide up and down. In these bearings and in the top of each side a semicircular groove should be cut from top to bottom to catch and carry of any rain that may find its way in at the edges off the sides of the lights. The lights are made of stuff from $1\frac{1}{2}$ inch to $2\frac{1}{2}$ inch thick, and are furnished with three or more grooved sash bars, as shown, and strengthened by a flat iron bar about $\frac{1}{4}$ inch thick and one inch wide, let into the under side of the framework of the light, and passing through slots cut for it in the sash bars. This bar is shown at I in each light, and at J an iron handle, which is screwed to the edge of the top of the frame to afford means by which it may be more easily pushed down or drawn.

up into its place when down. Frames should be glazed with 21-ounce glass.

GREENHOUSE.

Glass structures of even the smallest kind would, a very few years ago, have been considered a piece of great extravagance for any but the affluent. But now, on the contrary, there are few who would consider the garden as complete without a glazed house of some kind, however small, or however plainly made it might be. For any handy man who can use carpenter's tools

artificial warmth therein. If there be no heating apparatus it is known as a cool house or cool greenhouse. It occupies an intermediate position between the conservatory—which is simply a glazed structure generally attached to the dwelling-house, and merely used as a receptacle for plants that have been brought on to flowering point in the greenhouse, forcing-pit or stove, and are kept in the conservatory until they have done flowering—and the stovehouse, or hothouse, in which a much greater heat is obtained, and, indeed, required than in the greenhouse.

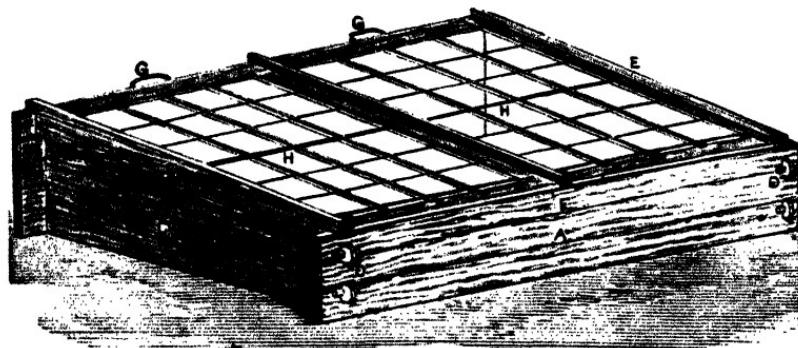


FIG. 3.—TWO-LIGHT GARDEN FRAME IN ISOMETRICAL PERSPECTIVE

the construction will present no very great difficulty, as may be seen from the article that immediately follows this. Putting up the framework or skeleton, as it may be called, painting, glazing, fitting with shelves, and even with a heating apparatus, and furnishing with a suitable flooring, can all be easily accomplished, and the result both in appearance, and in the raising and maintenance of flowers and seeds for the garden that require protection at the outset, will be satisfactory in many respects. Technically speaking, the greenhouse may be defined as a house which is supplied with means of obtaining

FURNISHING OF SMALL GREENHOUSES.

Among the thousands of villas and neat cottages which surround all our large towns and cities many have their small greenhouse or conservatory, and trim little garden back and front, capable of growing a concentrated selection of the most choice plants on a small scale. It may be that the garden has to be planted with half-hardy plants. The greenhouse, however small, then comes in very useful for keeping a supply both for the garden in summer and the window and rooms during winter. A stock of geraniums, verbenas, petunias, lobelias, are struck in the months of July

and August, and stored away for planting out the following season. After this is accomplished, a small collection of fuchsias will make the house lively; and as these are very easily cultivated, and may be stowed under the stage of the house during the winter, till the house is emptied in May, nothing is better for the purpose. As sorts are continually changing, on account of the hybrids that are now brought fresh into the market yearly by the principal growers, it is useless to give lists of any particular species of flower or plant. As the house will have to be stocked in the first instance, a visit to the nearest seedsman and florist will put the buyer in possession of the names, not only of the best, but of the newest sorts, but of as many of them as he may wish to acquire for stock.

If it be desired merely to maintain a succession of plants in bloom during the year, it is advisable to select plants for the time in which they flower. Thus half a dozen azaleas, which flower in May; pelargoniums flowering in June; fuchsias in the three following months; then a few chrysanthemums, followed by *Primula sinensis* and heaths. A few dozen of bulbs will present a succession of flowers till May. By this simple process, which is easily managed, a continuous show of flowers can be obtained. Good plants for a small collection may be chosen from—

Abutilions.	Diosmas.
<i>Acacias iophantha,</i>	<i>Epracries.</i>
<i>Armata, Rotundifolia, Virgata.</i>	<i>Ericases.</i>
Azaleas.	<i>Helichrysums.</i>
Camellias.	<i>Linums.</i>
Cianthus, or Glory Pea.	<i>Mesembryanthemums.</i>
<i>Coronillas.</i>	<i>Myrties.</i>
<i>Correas.</i>	<i>Pimeleas.</i>
<i>Daphne japonica.</i>	<i>Plumbago capensis.</i>
<i>Deutzia gracilis.</i>	<i>Solanums.</i>
	<i>Veronicas.</i>

A selection from such as these will give satisfaction. A few geraniums might be added, and some plants of *Primula sinensis* and *cinerarias*.

Calceolarias of the herbaceous kinds are well worth cultivating, and where grown in a small way, had best be sown in July, covering the seed-pots or pans with a piece of glass, and placing them in the shade. A few bulbous-rooted plants would be found very useful. *Lilium album, punctatum, and rubrum; Oxalis tubiflora variabilis, Rosca-flava, Ixia aurantica, Lachenalia tricolor, Cyclamen Coum, Persicum, Europum*, are still very attractive in their season, giving them a season of dry rest soon after the bloom is over.

A few useful chrysanthemums for autumn-flowering also might be purchased, a selection being made from each variety. Having obtained some plants as stock, cuttings may be struck any time from November to June, or even later, and may be had of all sizes. Useful climbers for a small greenhouse are *Passiflora caerulea, Ecremocarpus scaber, Hibbertia volubilis, Solanum jasminoides*.

Maurandia Barclayana might be trained up the back or pillars. It is necessary to make a proper bed or border of earth for these to grow in.

Plant-culture is not the only use to which a small greenhouse may be put: the practice is not uncommon to grow fruit in them. For this purpose small fruit-trees are grown in pots; the roots being confined, they are not liable to run to wood; but keep within bounds for the more certain production of flowers and fruit. Any one who can cultivate flowering plants may grow fruit-trees in pots; the only points being to keep them well supplied with water while in a growing state, and to ripen the wood well in the autumn. A long list of fruit-trees suitable for the purpose might be named; but the following may serve as a guide. They are usually worked on quince or paradise stocks, which, in a great measure, serves

to keep them within proper limits as to size :—

APPLES.—Braddick's Nonpareil, Cellini, Golden Pippin, Orange Pippin, New-town Pippin.

PEARS.—Beaurré, Hardy, Marie-Louise, Bon Chrétien, Winter Nelis.

PLUMS.—Victoria, Green-gage, Purple-gage, Topaz.

CHERRIES.—Bigarreau, Elton, May Duke, Morello.

PRAACHES.—Noblesse, Royal George, Crawford's Early.

NECTARINES.—Impératrice, Newington Early, Stanwick.

A glass structure, however, must be of some size to accommodate even a very limited number of trees in pots.

GREENHOUSE, SMALL, FOR AMATEURS.

The greenhouse shown in the accompanying diagrams, of which Figs. 1 and 2 are the front and end elevations of the house respectively, may be built either as a lean-to against a brick wall, or independently of any wall or structure behind, in which case it must be furnished with a

are each formed in a piece to move bodily, the front and roof may be made each in one piece or in separate parts. The most

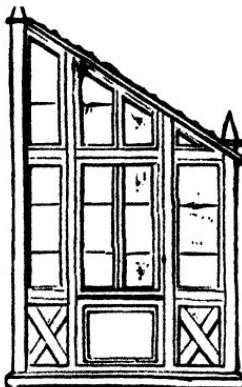


FIG. 2.—GREENHOUSE (SIDE OR END ELEVATION).

feasible way would be to make the wood-work below shown as panels in the drawing and the glazing above, in four separate pieces, as the two pieces in the centre could then be made to open for ventilation.

The roof may be made in three pieces, and in this case the two central panels should terminate at a cross-rail set across the frame at A and B, to admit of small lights above between this rail and the top rail of the roof for ventilation. The house stands on a platform on sill-piece of oak framed separately, and the sills, on lower rails of the framing above, are screwed down upon it. It is almost needless to say that the oaken sill should be bedded on concrete, and that the floor of the house should be formed of the same material, sloped from

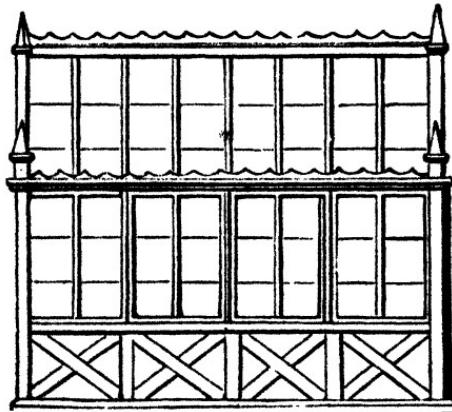


FIG. 1.—GREENHOUSE (FRONT ELEVATION).

back. A useful feature in this design is that any greenhouse built on this plan can be easily taken to pieces and re-erected in any other place at small cost. The ends

all sides to one corner, at which an outlet and drainage should be provided for surplus water that may fall on the floor when the plants are watered. For the sake of orna-

ment circular heads may be made to the lights, if preferred to square or rectangular heads. In Figs. 3, 4, and 5 the details employed in bolting the front (and back, if the house be furnished with a wooden back) to the roof of the uprights at front and back are clearly shown. In Fig. 3 the plate A is mortised into the pots B, and a hole is bored with an auger through post and tenon until a recess notched in the plate below

Fig. 4 the front rail, and in Fig. 5 the back rail of the roof; and in each of these figures the shaded part of A represents the top rail of back and front respectively; for even if the back be formed by a brick wall, or the wall of a house, or any other structure, a wall plate from end to end will be required to help in supporting the framing that forms the roof. A fillet is nailed on the sides of the roof to give a finish to this part of the structure, and to prevent the rain from finding its way to the bolts, caps, as shown in the front and end elevations and in detail in Fig. 5, are placed at the four corners of the roof. The difference in the form of the caps in front and the caps behind is perceptible in Fig. 3.

It will be obvious to any one who wishes for a span-roofed house that a greenhouse of this form can be easily made by putting two lean-to houses together, so to speak. That is to say, by making *two* front elevations and *two* roofs, as shown in Fig. 1, and *doubling* the side elevation shown in Fig. 2, omitting the upright at the back, for each end of the house all the parts required will be at hand. It must be remembered that the door, as shown in Fig. 2,

A is reached, in which the nut is held until the end of the bolt has been passed through it. The nut, which is circular, with notches on its edge like the milling of a coin, is then screwed up tight with a screw wrench made in the form of a large pair of bent pliers, until the post is brought as closely as possible against the tenoned end of the plate. The framing of the roof is secured in precisely the same manner as shown by the bolts in Figs. 4 and 5. In these the shaded part of the top, lettered A, represent in

should be in the *centre* of one end instead of the position indicated in the illustration for the door of the lean-to. The two sides of the roof must be battened against a ridge board running along the top from end to end, and at each end of the ridge board should be a cap by way of finish similar as to the cap shown in Fig. 5, but modified to suit the position in the lower part where it is attached to the roof and ends. But in this as well as in all details of ornament the builder can exercise his own taste.

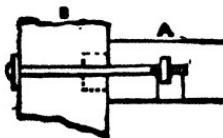


FIG. 3.

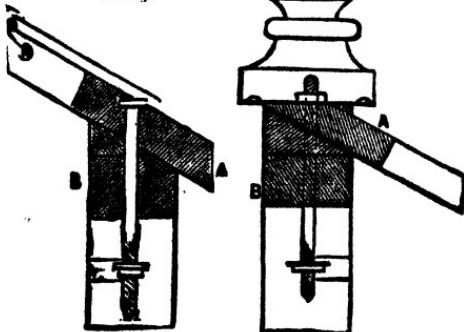


FIG. 3.—CONNECTION OF PLATE AND POST. FIG. 4.—CONNECTION OF ROOF AND UPRIGHTS, FRONT.
FIG. 5.—CONNECTION OF ROOF AND UPRIGHTS, BACK.

DAMPING OFF.

When the leaves, flowers, or stems of plants decay prematurely and present a rotten and mildewed appearance, they are said to "damp off." This damping off is sometimes caused by too much moisture in the air, or an excess of water given to the roots. Over watering when the plants have been kept too dry is sometimes the cause. Too low a temperature will often occasion it, and then the obvious course is to raise the temperature. The transfer of the plants which are thus affected to fresh soil will sometimes check it, but this can by no means be regarded as a sure and effectual remedy.

DRAINAGE OF POTS.

The effectual drainage of pots does not consist so much in the quantity of drainage as in the arrangement of it. A potsherd should be placed over the whole; some pieces of pot, broken rather small, over that; and these again covered with a layer of peat-fibre or rough earth. This gives efficient drainage, and need not occupy more than an inch and a half of the pot. The pots made in accordance with Crute's patent are so constructed as to greatly facilitate drainage, and the introduction of broken potsherds, otherwise known as "crocking," is obviated by the use of Crute's Patent Cap, which induces perfect drainage and promote aeration and ventilation of the soil.

FUMIGATION, EASY MODE OF.

The following simple method of fumigation is recommended by a writer in "Gardening Illustrated":—"To kill green fly on plants, take a short tobacco pipe and attach to the stem any length of india-rubber tubing, the size of a feeding-bottle tube;

the bowl three parts full of strong tobacco, light it, place a piece of muslin or flannel over the bowl, and holding the end

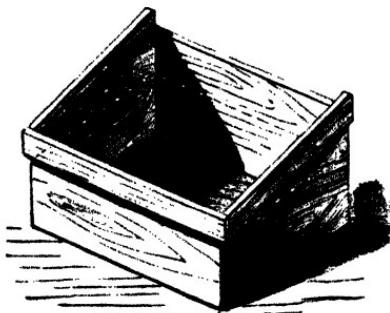
of the pipe about 2 inches from the place affected, blow through the tube, when such a dense volume of smoke is emitted from the bowl that in the course of thirty seconds the insects will drop dead or can be shaken off. Great care should be taken that no juice falls on the foliage, or it will destroy it." The writer says that he has used this method with complete success for years, and it beats everything he is acquainted with for cheapness and effectiveness when single plants require fumigating.

Further, Samuel Wood, in his "Modern Window Gardening," recommends the following method of fumigating plants, stating it to be especially applicable to calceolarias, which are especially liable to be infested by green fly when placed in the window or conservatory. He says:—"As soon as their presence is detected, the plants, in a dry state, should be placed in tight box or tub, which must also be quite dry. If the box be deep enough, the plants may be placed upright in it; if not, they may be laid down. This done, take half an ounce of tobacco paper, which costs one penny, and will be enough to cleanse a dozen plants; light the tobacco and place it in the bottom, and then as quickly as possible cover the top over with a close damp cloth of some kind, and let the plants remain in for an hour, when they may be taken out and the foliage syringed or watered with a fine rose water pot. Repeat as often as may be necessary, or dust the plant over with tobacco powder when the green fly appears."

PROPAGATING BOX.

For propagating boxes, any of the boxes, large or small, in which articles of various descriptions, such as coco, starch, mustard, tinned salmon and lobster, Swiss milk, &c., are sent in bulk to grocers, may be easily adapted to suit the purpose in view, and they can be easily cut so that the

top may slant in one direction, as in the accompanying illustration, or both ways, like the roof of a house, ledges being nailed externally to sides and bottom to form a rebate to receive the glass. If the box be deep enough, triangular pieces must be cut off each side and the front reduced in order to give the proper inclination to the glass, but if the box be shallow triangular pieces may be added to the sides, and the back raised as shown by the dotted lines in the illustration. Seed pans may be formed out of the bottoms of butter tubs and mustard tubs, both of which may be bought for a few pence of any grocer. And these tubs, when of sufficient size, answer



PROPAGATING BOX

every practical purpose for forcing rhubarb, while half-tubs will be large enough for seakale.

BOTTOM HEAT.

The application of bottom heat, or heat from sources immediately below and under the roots of plants, is nothing more than the adoption and imitation of a natural process. Between the temperature of the air above and that of the soil below there is always a certain relative proportion, and as the temperature of the air rises and falls so will the temperature of the soil also increase and

decrease, as the case may be, and although the increase or decrease of the temperature of the soil is less rapid and far more gradual than the change in either direction in the heat of the atmosphere, yet the former surely follows the latter, and thus the average proportion is maintained and preserved. Bottom heat, then, which, in other words, is heat applied to the soil in which plants are growing, and consequently to the roots of the plants, is an imitation of this natural process in any structure intended to stimulate and hasten the growth of plants. Let us suppose two cases in which the proper average relation in the temperature of the soil and the atmosphere has not been preserved—one in which the temperature of the former is too high, and another in which it is too low, in proportion to that of the atmosphere. Under the first condition, when the temperature of the soil is too high in proportion to that of the atmosphere, plant food will be absorbed by the roots and transmitted to the leaves at a rate faster than that at which the leaves can assimilate it in a proper manner, and the consequence is an overdue development of shoots and leaves, the suppression, if not the absence of, blossom, and a departure from normal healthy progress. On the other hand, under the second condition, when the temperature of the soil is too low in proportion to that of the atmosphere, plant food cannot be absorbed by the roots at the rate that is required by the foliage, stimulated to greater action and consequently greater demands for nutriment by the undue warmth of the air, and in the absence of sufficient support, the leaves will flag, droop, and ultimately wither, and the blossoms, or the fruit, if set, will fall off.

BOTTOM HEAT, REGULATION OF.

The regulation of the temperature of the

soil under the application of bottom heat, and its modification at all times of the year in due proportion to the ruling temperature of the air, is thus ably explained by a writer in the "Cottage Gardener's Dictionary," who says:—"Every plant obviously will have a particular bottom heat most congenial to it. Plants growing in open plains will require a higher bottom heat than those growing in the shade of the South American forests, though the temperature of the air out of the shade may be the same in each country. That gardener will succeed in exotic plant culture best who, among his other knowledge, has ascertained the relative temperature of the air and soil in which any given plant grows naturally. At present, such information from actual observation is not obtainable; but it is not so difficult to obtain the maximum and minimum temperature of the air of a country, and, these being obtained, the gardener may adopt this as a safe rule: Let the bottom heat for plants of that country be always 5° higher than the average temperature of each month—that is, if the lowest temperature of the month is 44° and the highest 70°, the average is 55°, and if we add 5° to that, we shall have 60° as the bottom heat for that month. If the average maximum temperature of the air only be known, let the bottom heat be less than 10° than the *maximum* temperature of the air."

From this we may gather that the bottom heat in plant growing, especially as regards exotics, may be and must be suited to the natural climate of the country of which the plant happens to be a native. In raising seeds and striking cuttings of plants which have been brought from other countries, or which, in other words, are not indigenous to our own country, but will germinate or form roots, as the case may be, in the open air in our own land,

all that need be done is to raise the temperature to summer heat at the utmost, in order to accelerate growth, which would otherwise take place in the natural way at the normal time. If coldness of soil and coldness of the atmosphere forbid growth altogether, or exercise too great a retarding influence on it, it must be remembered that excess of heat in soil and air will draw up plants in telescopic fashion, like children who have grown beyond their strength, and a forced unhealthy growth will take the place of the short, compact, vigorous growth which is the outcome of proper progress.

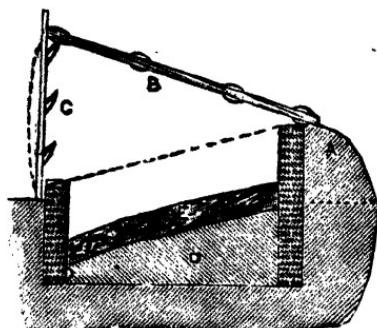
BOXES, TUBS, &c.

For growing large plants and shrubs that cannot conveniently be grown even in pots of the largest size, tubs and boxes must be used. Sometimes the larger butter tubs from the grocer will be found sufficient as far as size goes, but it is desirable to have them girt with iron hoops, as the wooden hoops frequently give in a short time by the swelling of the wood of the tub by the moisture absorbed from the soil within when the plant is watered. Strong tubs, such as halves of wine casks, &c., may be obtained of the cooper. Boxes of any kind and size may be made by the gardener if he can turn his hand to the execution of a little simple carpentry. It is not possible, however, to dwell at any length on the construction of such appliances here, though it is necessary to call attention to them as being among the numerous appliances of various kinds that are used in gardening, and may be required at some time or other by every gardener.

COLD PIT.

A very good cold pit may be formed by building containing walls of turf or of earth well beaten together, so that the back wall is higher than the front wall, and the sides

sloping from back to front like the sides of a pit or frame, so that lights may be placed over it on frames covered with any protecting material. A cold pit of this kind, well



SECTION OF COMMON COLD PIT.

and firmly built, will last a long time, and is most useful in the winter for sheltering vegetables liable to injury from frost, and half-hardy plants, which will do well with this minimum of protection. If the bottom of the pit be sunk below the ground level it will be all the warmer, and the containing walls above the surface of the ground need not be made so high. A cold pit of greater strength and permanence may be made in the same manner by making an excavation in the earth about 2 ft. deep, and surrounding it with containing walls about 1 ft. above the level in front and 2 ft. behind, which must be finished at top with a wooden kerf, and bars from back to front, if long enough to require them, to support the lights.

Speaking of the cold pit, Loudon says: "The cold pit with earthen sides is in part sunk in the earth, and in part raised above it by walls of loam or turf. On these walls glass frames are sometimes placed; and at other times only mats or canvas frames. Such pits are used by nurserymen and market gardeners, and answer perfectly

for the preservation of half-hardy plants. A pit of this kind is shown in the annexed illustration. It is a sunk wall excavation 3½ ft. wide, and 3 ft. deep at back, and 1 ft. 9 in. in front. It is covered with movable thatched frames, which are tilted at pleasure by a notched prop. It is used as a kind of storehouse for all culinary vegetables in leaf which are liable to be destroyed by frost, such as cauliflower, broccoli, endive, lettuce, &c. These, before the winter sets in, are taken up from the open ground with balls of earth, and embedded on a bottom layer of rich soil, filling up the vacancies between and among the stems with old bark or decayed leaves. Air is given on all occasions when it can be done with safety, and in severe frosts additional coverings of litter are put on." In the accompanying illustration A shows a bank of earth thrown up against the back containing wall in order to increase the warmth of the pit, the ordinary ground level being preserved in front; B is the thatched frame in section, supported, when raised to admit air, by the notched stick C; D is the mould in which the plants are set; and E the leaves or bark



MAT FOR COLDFRAMES.

that should be thrown in between and among the stems of the plants.

MATS FOR COLD PITS, &c.

Straw mats for covering frames and minor glass structures in frosty weather, and for shading them in the heat of summer, are easily made, and may afford

FERNERY.

profitable employment in the winter season at the time when nothing can be done in the open ground. The proper kind of straw for making mats of this description is wheat straw or "reed," as it is called in Devonshire, and which is always combed to clear it of the withered leaves that adhere to it. Enough to make a small bundle of about 1 in. or $1\frac{1}{2}$ in. in diameter is grasped in the hand, and some tarred twine is brought round in three places, or more, if thought desirable, as shown in the accompanying illustration. Successive bundles of straw are added until the required size is obtained, the strings which are under in one layer being brought over for the next layer. When the last layer or bundle has been added, the strings are securely tied and the ends cut off. In making a mat for a frame 6 ft. in measurement from top to bottom, it will be found necessary to make each layer of two portions of straw, having the ends turned outward and the heads brought together in the middle, but when a narrow mat is made, the ends of the bundles should be disposed on one side in one layer and on the opposite side in the layer next to it. It is better also to make the mat so that the straw may be arranged longitudinally from the top to the bottom of the light, and not transversely, as in this position the rain that may fall on it will be conducted more readily from top to bottom.

FERNERY.

Indoor Fernery.—The construction of the indoor fernery is similar to that of any glazed structure, but its position should be exactly opposite to that of the conservatory or greenhouse—that is to say, it should front to the north, north-east, or north-west, while the frontage of the greenhouse should be to the south, south-east, or south-west. In the arrangement

the interior, too, there is a marked

difference, the greenhouse being furnished with shelves and stages at various heights for the support of the plants, made, generally speaking, of laths or battens, and the fernery with brackets, pockets, platforms, and terraces, to which a rustic appearance is imparted by giving these structures, large and small, an ornamental facing of "virgin cork," as this material is generally called, and such forms as may be best calculated to set off the beauty of the foliage of the ferns that are placed in them. Virgin cork may be obtained of most nurserymen and seedsmen at about 3d. per lb., or in bales of 56 lb. from 1s. to 1s. 6d. per bale, 112 lb. from 2os. to 25s.

Outdoor Fernery.—The fernery out of doors must be stocked exclusively with hardy British and exotic ferns. Of these none will bear the light and heat of the summer sun in full force, and a situation should be chosen for it which is shady and near water, or in which water can be supplied by artificial means. By this it must not be taken for granted that any moist, dank spot will do for ferns; on the contrary, they like good drainage as well as shade and moisture, and efficient drainage should always be provided. The moisture in which they most delight is a humid atmosphere, and a moisture cunningly created by artificial means, and consisting of drips and splashes that fall in almost infinitesimal quantities on the fronds and sustain their verdure unimpaired.

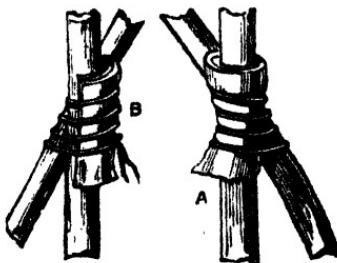
Position.—A shady bank, or cool spot on the edge of a pond or the brink of a rivulet, is a good position for an outdoor fernery, and admits of treatment by the aid of a few boulders and stones, and even clinkers or masses of vitrified brick, which produce an effect more closely akin to nature than can be attained when the structure is due entirely to art. Failing

such positions in gardens and back yards, the best must be done by artificial means, and even under such conditions a fernery that is satisfactory to the eye and suitable in every respect for the plants that are to be placed in it, is by no means difficult to attain or troublesome to manage, provided that the primary requisites of coolness, shade, and moisture are obtainable.

Construction. — When a position that requires little assistance from art can be obtained—such as a cool, shady nook near water, or by a running stream—all that is necessary is to dispose some masses of stone, roots of trees, burrs, &c., in such a manner that they may be partly embedded in the soil, and afford corners, as it were, here and there, in which various kinds of ferns can be judiciously located with regard to their respective habits and appearance and the effect that each is designed to produce. In making a piece of rockwork for ferns, or otherwise *building* a fernery, so to speak, supposing that the work is done on the level or a little below the level of the ground, as may be the case when the upper part of the soil is removed to furnish part of the material for the structure, the first thing to be done is to provide for thorough drainage below the surface by excavating, and filling up the hollow thus formed with brickbats, stones, and other materials which lie together in such a manner as to have interstices of various sizes between them, and thus afford ample room for the escape of moisture from the structure above and its absorption by the soil below. If economy with regard to soil is necessary, a heap of the same material may be thrown up on which to place the compost in which ferns will best thrive, which may be made of good garden soil mixed with leaf mould, some good loam, and a fair proportion of light fibrous peat and sand. Then on the surface of the bank thus

formed place stones of various kinds, some on the soil itself and others half buried in it, with roots of old trees, flints, clinkers, &c., disposed so as to leave crevices here and there in which the ferns may be planted.

Planting. — The fernery, or rockery, being ready for the reception of the plants, put the roots into the crevices provided for them, keeping the crown just above the soil, and pressing the earth firmly about the roots. If the bank of earth below the stones, &c., has been of necessity made of garden earth alone, introduce a liberal quantity of compost of



METHOD OF TYING TREE TO STAKE.

yellow loam, peat, and sand into holes made in the soil to receive it before planting the ferns. Some ferns require a greater depth of soil than others, and some again, such as the Common Polypody and Hart's-tongue Fern, will grow admirably on a wall, which shows that they require but a minimum of soil in which to root. In planting ferns, the taller sorts should be placed at the back of the bank, those of medium height in the centre, and the dwarf varieties in front.

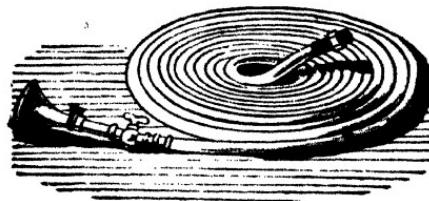
ATTACHMENT OF PLANTS TO STAKES AND SUPPORTS.

As regards the means of attaching plants to sticks and supports of all kinds, if it is a tree to a stake, or the stem of a hard-

ATTACHMENT OF PLANTS TO STAKES.

wooded plant, such as the honeysuckle, &c., that may be tied without danger of injuring the bark, tarred cord may be used. Of course, climbing plants may be tied loosely so as not to cut into the bark or stem in any way; but when a tree is tied to a supporting stake, it must be bound to it tightly. To prevent injury to the bark, something soft must intervene between the string and the tree and the stake. There is nothing better for this purpose than a piece of old Victoria felt carpeting, a strip of which may be wrapped three or four times round the stem, as shown at A in the accompanying illustration, or folded to form a wad, and placed on the side of the tree opposite to that on which it is touched by the stake, as at B; but if the latter mode be adopted, it is desirable to place another thickness or two of the felt between the tree and the stake, to prevent them

from being in absolute contact. The tarred cord may then be tied as tightly as it is possible to tie it. For tying plants and blooms of plants to sticks, &c., bast was formerly used, obtained from Russian matting made of the inner bark of the lime or linden tree. It was necessary to soak this to render it tough enough for the purpose for when dry it is extremely brittle. Of late years it has been superseded by raffia, a material obtained from the leaves of palm. This is sold by all nurserymen and seedsmen, at about 6d. per pound. It is very light, and the long strands are plaited together in lengths of about three feet, or a little more. The plait should be undone and tied at the thick end, to render the strands ready for use. The fibre is extremely tough, and can be used just as it is without soaking, which is a great con-



PART II.

FLOWERS: THEIR CULTURE AND MANAGEMENT.

THE culture of flowers, as far as general principles are concerned, has been touched on in the preceding Part, but it has been confined to the preparation of the soil for the reception of seeds and roots of every description, bulbs and plants included, and the formation of beds and borders is fitting and suitable quarters for them. Generally speaking, flowers, or to be absolutely correct in the matter of words, flowering plants of all kinds, require much the same treatment as far as operations on the ground are concerned, and the usual routine of sowing, planting, transplanting, and watering are concerned, but, in addition to this, many plants require special attention in the preparation of the soil in which they are to grow, and furthermore many will need different kinds of soil, because they will thrive better in one kind than another. For example, one kind may do best in a rich loam; another in heavy, cold soil, or even in ground that is persistently damp; a third sort may like a light, sandy soil; and a fourth enjoys peaty ground and will attain perfection in no other. Again, others will require little or no manure at all to help them to maturity, while not a few will only show up well in ground that has been heavily manured, and possibly, as in the case of roses, with manure of a particular description—that is to say, manure gathered from the cowshed, or cow-linhay, or cow-lodge, as it is differently termed in different parts of England, and not with that which has been removed from the stable.

Therefore, in the second portion of this volume to which the reader's attention is now directed, the special culture of various kinds of flowers is brought under notice, and in connection with the different kinds of soil that the plants like best, it has been sought to show when and at what season of the year they should be propagated, and by what means the propagation of each sort is best effected. Moreover, care has been taken to distinguish between the natures and classification of the different flowers—that is to say, whether they are annuals, biennials, or perennials, and whether the classes to which the flowers belong are confined to one of these three great divisions, or if the varieties included in the class or family consist of all three, as is often the case.

The habit of the plant or plants that are included under the same heading is also taken into consideration and described, or, at all events, mentioned when necessary; for it makes all the difference whether the plant is erect by nature, and therefore requires nothing in the way of a support, or if it be a

INTRODUCTORY.

climber, and therefore must be trained over a wall or trellis, or be supplied with poles or rods round which to entwine itself, or if it be a trailer which will run along the ground, or throw out shoots and stems which assume a pendent position, and are therefore fitted in the one case for rockwork and in the other for tubs or baskets, from which they may hang in graceful festoons, hiding the sides of either receptacle with the leaves and flowers that clothe the drooping stems. Examples of these will doubtless occur to every reader, and therefore there is no necessity to particularise any here.

The names of the different flowers, flowering plants, and classes of flowers that are noticed in the pages immediately to follow, are placed in alphabetical order to facilitate reference. To have recourse to an index is sometimes tedious, especially when one happens to be in a hurry, but even this is far from being so troublesome as turning from page to page in quest of any information that may be required, under the idea that what is wanted will quickly turn up, a trouble which may be avoided at any time by turning to the index, however distasteful the proceeding may be. How much better then to save the time both of those who do not care to consult the index, and those who are content to waste it by hunting through the pages at random for what they want, forgetful of the old but true saying, "More haste, less speed," by the simple alphabetical arrangement of the subject-matter which has been adopted here.

With regard to flower-culture, it is most probable that amateurs, generally speaking, will try to grow all kinds of flowers generally without any discrimination as to sorts, but even if this be done it is desirable for each and every gardener to adopt the culture of some special kind of flower, and to devote himself to this particular flower, with a view to achieve excellence in its production. Carnations afford a desirable class of flowers for special attention, and the object should be the production of healthy plants with large blooms, and if the grower has a knowledge of hybridising, which but few possess, he may direct his attention further to the production of new varieties from seed saved by himself. And even if he be ignorant of the art it is yet within his power to purchase seeds of good strains from well-known seedsmen, and so carry out his hobby. Pansies, again, are a good class of flower for this kind of work, with their large velvety blooms of an endless diversity of colours ; and the growth of Alpine auriculas is a pleasing pursuit, from the first appearance of the young plants till they have reached sufficient size to bloom, and each plant reveals the colour of its flower to the expectant grower, who will then, as a matter of course, select those that are worth keeping, and reject, for even in the culture of flowers, when followed up in the direction pointed out, just as with men and women, "the weakest goes to the wall," and from this sentence there is neither appeal nor escape.

ABUTILON.

A handsome, free-growing shrub, well suited for the decoration of the greenhouse, and also for planting in borders in tolerably well-sheltered spots. Many beautiful hybrids have been produced of late years. In the greenhouse it forms a good pillar plant. The flowers are for the most part of various shades of red and orange, but some varieties have white, pink, and even blue and purple blossoms. They are pendent from the stalk, and the petals being generally incurved at the top, the flowers assume a somewhat globular form. Many varieties have beautifully variegated foliage. Among the best varieties are *Abutilon aureum globosum*, deep orange, shaded with red; "Fleur d'Or," pale orange, veined with red; "Crimson Banner," rich crimson; "Violet Queen," rich purple, inclining to violet; "King of the Roses," deep rose; "Canary Bird," yellow; "Boule de Neige," white.

These plants are readily raised from seed sown in pans in compost of peat, rich loam, sand, and leaf-mould, or struck from cuttings in gentle heat in April and September. Temperature in winter from 35° to 40°. Plant out in the open ground about the end of May. Plants in pots must be well drained and freely watered. A little liquid manure may be given in the summer months. In autumn and winter but little water should be given.

ACANTHUS, OR BEAR'S

Herbaceous perennials, attractive for the beauty of their foliage; natives of Southern Europe. The most common varieties are *A. mollis* and *A. Spinosa*. From the former of these the original idea of the capital of the Corinthian order of architecture is said to have been derived.

All the sorts grow readily from seed, or they may be increased by dividing the



ACANTHUS, OR BEAR'S

roots. They require a light but rich garden soil and plenty of room.

ACHIMENES.

A genus of truly splendid plants, suitable either for the sitting-room, greenhouse, or stove, and especially adapted for baskets; they combine great beauty with a variety of rich and brilliant colours rarely to be met with. Some of them are remarkable for their peculiar markings, others for their large handsome flowers, while all are so exceedingly effective as amply to recompense the amateur for his care and attention, which are trifling compared with what some plants of far inferior beauty require. The hybrid varieties are very numerous, and the blooms are white, orange, rose, crimson, scarlet, blue, and purple, some being diverse in colour, and beautifully marked and veined. The character of the flower will be best understood from the accompanying illustration. For a detailed list of varieties readers are referred to the catalogues of the growers and to the nearest nurserymen and florists in their respective districts. To give them here would take up far too much space.

In growing use a compost of peat,

ACONITE—AGAVE.

and leaf-soil; or leaf-mould, loam, and silver-sand, and secure good drainage. Plant five to seven tubers in a five or six-inch pot, with their growing ends inclining towards the centre, and their root ends towards the circumference of the pot, and cover them with about an inch of the compost. While growing, they should be well supplied with liquid manure; start them when convenient in heat, and when an inch and a half high they may be



removed to the greenhouse. To keep up a succession, commence starting them in heat in January; and as one lot is taken out another should be put in, till May; do not neglect tying up the stems, or they will fall down and get injured.

Planted in pans or baskets and suspended, they will become objects of the greatest interest, falling gracefully over the sides, and literally covering the pot or basket with their truly magnificent flowers

AC'ONITE.

The generic name of a great variety of hardy herbaceous plants grown as perennials in gardens and on the verge of shrubberies. They grow from three to five feet in height, and produce long spikes of helmet-shaped flowers, mostly blue in

but also white and purple, and even yellow in some varieties. The most common are *Aconitum Napellus*,

or Monk's-hood, and *Aconitum lupicidum*, or Wolfsbane. Propagate by division of roots, and by seeds.

ADIAN'TUM CAPILLIS VENFRIS, OR Maidenhair Fern.

Can be cultivated as a window-plant. It requires warmth and light, and is improved by being cut down in the winter.

AGAPAN'THUS.

An African lily blooming in August, combining graceful foliage with large handsome heads of blossom. In flower-beds or masses, the blue variety, *Agapanthus umbellatus*, is lovely; planted in a strong rich soil, it produces a splendid effect, and when mixed with gladioli, either of the Ramosus or Gandavensis sections, the effect is unique. *Agapanthus umbellatus albiflorus*, a white variety, forms a good companion and excellent contrast to the preceding.

A nine-inch pot will be sufficiently large for a strong plant, but a large pot or tub is required for several plants; and this is the most effective and more usual way of growing the Agapanthus. Use a strong rich loam, and during the summer months give abundance of water, and liquid manure twice a week. In winter protect from severe frost, and water sparingly.

AGA'VE.

A plant consisting of a number of broad, fleshy leaves, with thorns protruding from the edges, throwing up from the centre a long flower spike, from which proceed branchlets sustaining flowers white and tinted with a yellowish-green colour. The Agave is usually supposed to live a hundred years before it flowers, but this is not the case. It is chiefly used for the ornamentation of terraces when placed in tubs or very large pots, and it is equally effective for this purpose in the greenhouse. There are many varieties, but the best known is the *Agave Americana*, or American Aloe,

which reaches a height of twenty feet, and even more when flowering. The word "agave," it may be said, is pronounced *ag-a'-ve*. It requires a rich, loamy soil, mixed with river sand, and some peat and leaf-mould. Plenty of brick rubbish should be placed at the bottom of the tub or pot to supply means of thorough drainage. Propagated by suckers thrown off from the parent plant. Agaves should be freely watered in summer.

AGERATUM.

Useful, half-hardy annuals. The shades are blue, white, and red. The seed should be sown in a warm border in a light soil in April or May. There are many species of Ageratum, but the best known is *Ageratum Mexicanum*, from which many varieties have been produced, the most noticeable being, perhaps, "Swanley Blue," and "Cupid," both blue; "Snowflake," white;



and "Queen," with flowers of a pretty silvery grey.

AL'MOND.

The common Almond—*Amygdalus communis*—is well known from its being one of the earliest flowering trees known in this country, when it is literally covered with pink blossom, which appears before

the leaves. It does not bear fruit in our latitude. The tree is perfectly hardy, and highly ornamental.

AL'OE.

A greenhouse evergreen succulent with thick fleshy leaves, usually in the form of a rosette and growing in sets of three or five. Plants in pots or tubs, well drained with broken bits of brick, crocks, and lime rubbish in compost of and well-rotted manure. Propagate from suckers. Water freely in summer, but sparingly in winter, during which plants should be kept in a temperature of from 35° to 40°. There are many varieties.

ALOYSIA, OR LEMON PLANT.

A greenhouse, deciduous shrub, with long, lanceolate leaves, which exhale a delicious perfume. It is suitable for the cold greenhouse, but requires protection from frost in winter, even under shelter. Re-pot in the spring, when the plant begins to break and the young shoots are from 1 to 2 inches long, using firstly a smaller pot than that in which the plant has been growing. Set in rich mould. When well rooted, transfer to larger pot. Only one kind of this plant is grown, and this is known as *Aloysia Citriodora*.

Propagate by cuttings which should be taken in March or August. Plant in light sandy soil in gentle heat.

ALPINE PLANTS.

Plants thus named are generally used for rockwork. They are brought from mountainous districts—hence the name. Among these stand conspicuous the Alpine auricula, gentian, &c.

Plant Alpines in ordinary border or rockery, or set in small pots, well drained, in light loam, well mixed with sand or road grit.

ALSTROMERIA.

A tuberous-rooted plant, hardy, and suitable for borders in which the soil is rich and light. They require slight protection in winter, and should be watered freely when growing in summer. There are many varieties, hybrid and otherwise, but *Alstromeria aurantiaca* may be mentioned as a good and showy type of the class.

ALYS'SUM.

Free-flowering, useful, pretty little plants for beds, edgings, or rockwork. The annual species bloom nearly the whole summer; the perennials are amongst our earliest and most attractive spring flowers. The varieties are —

Alyssum argenteum, — yellow, with silvery foliage, hardy perennial, 1 ft., from Switzerland.

Alyssum Atlanticum, — fine light yellow, very ornamental, hardy perennial, ½ ft.

Alyssum Bertolonii, — white, very fine, hardy annual, 1 ft.

Alyssum saxatile, — yellow, extremely showy, hardy perennial, 1 ft., from Candia.

Alyssum saxatile compactum, — golden-yellow, very compact, free flowering and beautiful, hardy perennial, ½ ft.

Alyssum Sweet, — white, very sweet, hardy annual, ½ ft., British.

AMARANTHUS.

Half-hardy annuals, very graceful, with highly ornamental foliage. *A. ruber*, with



AMARANTHUS CAUDATUS GIBBOSUS.

dark carmine foliage, is a most strikingly beautiful plant for bedding, ribboning, or

massing. Other varieties are *A. bicolor*, leaves yellow and green, and *A. tricolor*, red, yellow, and green, and *A. caudatus gibbosus*, with long pendent crimson flowers growing on the long flower-stem in knots.

Sow in heat in early spring; plant out in May and June in very rich soil.

AMARYL'LIS.

Flowers of rare beauty, whose large, drooping, bell-shaped, lily-like blossoms range in colours from the richest crimson to pure white, and striped with crimson or scarlet. They are easily cultivated, and with a little management a succession of bloom may be secured throughout the year. Some varieties do not require heat. A moderate supply of bulbs will serve the purpose.

Varieties which do not require heat

A. *Belladonna purpurea* (*Belladonna Lily*), — white flushed with rosy purple.

A. *Belladonna blanda*.

A. *formosissima* (*Sprekelia formosissima*), — rich crimson.

A. *longifolia alba* (*Crinum capense alba*), — white, sweet-scented.

A. *longifolia rosea* (*Crinum capense alba*), — rose, sweet-scented.

A. *lutea* (*Sternbergia lutea*), — yellow, flowers in autumn.

Place the bulbs in front of a wall facing south, at least six inches under the surface, giving them a little winter protection: should the growing season be dry, water freely till the plant blooms, but when at rest the bulbs should be kept as dry and warm as possible. When heat is required, use six or seven-inch pots, placing at the bottom a handful of potsherds and covering them with turfy peat, filling up the pot with a compost of rich loam, leaf soil, and silver sand, leaving only the neck of the bulb uncovered; the pots should then be either placed in a stove-frame or any other root-temperature, such as the modified heat of a tank or flue, and a few weeks will develop the flowers:

immediately the leaves appear, give abundance of water, and encourage a vigorous leaf-growth. When the plant has done blooming, gradually withdraw the water, and give the bulbs an entire cessation from growth for eight or ten weeks, when they may again be re-potted and forced as before.

AMERICAN PLANTS.

Under this general name are included Rhododendrons, Azaleas, Kalmias, Ledums, Andromedas, and others, which are supposed to require what is called bog earth. This, however, is not absolutely necessary to their successful cultivation.

In the following list some choice plants—broadly distinguished as American plants—are named, which will be found useful in the shrubbery, or in any collection of trees and shrubs. Generally speaking, they will thrive in any good soil, but will do best in peat earth, or in soil with which peat earth has been plentifully mixed. Rhododendrons, Azaleas, Kalmias, and Daphnes were long supposed to require bog earth for their culture, but they are now found to bloom well in a stiff clay, and such a soil, with a moderate admixture of bog peat and brick and lime rubbish, is found to be admirably adapted for their growth. If in a garden there happen to be a north wall, or wall which faces north and looks towards the house, there is no place more suitable for clumps of American plants. It is well to draw attention to this, even though it is the shrubbery and its tenants that are now under consideration.

CHOICE AMERICAN PLANTS FOR SHRUBBERIES,
ETC.

Height

in feet.

<i>Andromeda floribunda</i>	2 to 2
" <i>polifolia</i> Wild Rosemary	1 " —
" <i>grandiflora</i>	1 " 2
<i>Azalea calendulacea</i>	6
<i>lepidota</i>	2,
<i>procumbens</i>	4 " —

	Height in feet.
<i>Erica Australis</i>	3 to 6
" <i>carnea</i>	1, —
" <i>cineræa alba</i>	1, 1
" <i>rosea</i>	1, 1
" <i>Mackiana</i>	1, 2
" <i>Mediterranea</i>	4, 6
" <i>stricta</i>	2 to 3
" <i>tetralis</i>	1, 1
" <i>vagans</i>	Cornish Heath 1, —
<i>Gaultheria procumbens</i> Creeping Winter-green ...	1, —
<i>Shallon</i>	3, 5
<i>Kalmia augustifolia</i>	2, 3
" <i>rubra</i>	2, 3
" <i>cuneata</i>	2, —
" <i>glaucæ</i>	1, 2
" <i>hirsuta</i>	1, 1
" <i>latifolia</i>	3, 10
<i>Ledum glandulosum</i>	2, 6
" <i>latifolium</i> Labrador Pea	1, 3
" <i>Canadense</i>	3, 6
" <i>globosum</i>	3, 6
" <i>palustre</i>	2, 1
" <i>decumbens</i>	2, 1
<i>Rhododendron albiflorum</i>	2, 3
" <i>Catambienæ</i>	3, 5
" <i>chamaecistus</i> Ground Cistus	3, 1
" <i>Dauricum</i>	2, 3
" <i>Ponticum</i>	10, 12
" <i>odoratum</i>	3, 4

The plants named in the foregoing list all belong to the natural orders *Ericaceæ*, or Heathworts, and, being thus akin, they require for the most part similar soil and treatment. The soil that is suitable for them has been already mentioned. The Andromedas may be propagated by layers in September; Azaleas by layers in March; Ericas by cuttings consisting of the points of shoots plunged in sand or sandy peat, covered with a bell-glass, and put in a close pit or frame; Gaultherias by layers and seeds; Kalmias by young shoots under hand-lights, by seeds in shallow pans in close frames, or by layers at end of summer; Ledums by layers; and Rhododendrons by seeds in spring sown in shallow pans and kept in close frames, by layers in spring or autumn, or by cuttings of young shoots taken when the base close to the older wood is getting firm, and set in silver sand, placed at first in a close frame, and afterwards subjected to a little bottom heat.

The following materials, all of them within the reach of most persons, may be

AMPELOPSIS—ANEMONE.

made to form a compost adapted to their culture. Rotted leaves, spent tan, sawdust, old thatch or straw, weeds, grass-mowings, and vegetable refuse of all kinds—old manure, even the bottoms of old wood-stacks. Any or all of these in a decomposed state, blended with a certain proportion of garden soil, may be rendered fit to grow American plants; but as it is the character of all decomposed vegetable matter fit to enter rapidly into the composition of the vegetable fabric, to subside rapidly, this must be guarded against by employing also such organic matter as tree-leaves, lumps of peat, peaty turf, or other vegetable matter, which will take long before decay takes place. Where old tan or sawdust is liberally used, the leaves should be fresh; those which have been used as linings for hotbeds by preference, from their tendency to mass together. Old thatch, or litter, forms an excellent basis for the whole clump, and weeds and other vegetable refuse, when burnt or charred. This compost, with a subsoil sufficiently retentive of moisture, and situation not too much exposed to the direct influence of the sun, will grow these beautiful shrubs in great perfection.

AMPELOPSIS. See Virginian Creeper.

ANDROM'EDA.

Hardy, evergreen, heath-like shrubs, natives of North America. They delight in bog, like all other so-called American plants, and their roots should never be suffered to become quite dry; for if this occurs, the plant has seldom vigour enough to send out a sufficient quantity of new roots, and in general dies. All the kinds may be propagated by layers, or by seeds sown as soon as ripe in pans or boxes and placed in a cold frame to germinate.

ANEM'ONE, OR WINDFLOWER.

Anemones, which are hardy tuberous

perennials, are harder than ranunculus, have a richer foliage, and their flowers resemble miniature semi-double hollyhocks. They also include most of the colours of the hollyhock, except a pure white or yellow; but to compensate for the want of these, nothing can exceed in loveliness the blue or purple, or in glory the scarlet, of the anemone. And although there is neither a white nor a yellow self among them, for the single *white* is not wholly *white*, yet several of them are beautifully striped with these colours. The foliage is elegantly cut, and the growth is neat and compact.



DOUBLE ANEMONE.

The flowers of the double anemone, as will be seen from the accompanying illustration, are extremely handsome; they have outer guard petals, resembling a semi-double hollyhock.

The single anemone, also illustrated here, has beautiful poppy-like blossoms of large size and various colours.

Anemones of both kinds delight in a light, rich, loamy soil, but generally succeed in any which is well drained. Sea-sand, or a little salt mixed with the soil, is a good preventive of mildew. They may be planted from October to the end of March,

and a succession of bloom thus secured in mild seasons, from February until July. They will flower well in almost any common garden soil, but it is desirable that the ground in which they are grown should be tolerably light (some consider that a calcareous, dry soil suits them best), and that it should be well drained and enriched with decayed manure, or manure from a spent hotbed. The tubers are generally planted in the early part of the year, but the roots can be obtained from September to March and it is desirable that beds should be formed about October, and the tubers



SINGLE ANEMONE.

planted immediately after from 4 to 6 inches apart. If the weather be very inclement during the winter, the beds should be covered with loose litter. The roots may be taken up for removal, or for drying off and replanting in autumn, as soon as the leaves have died off in spring. A change of position is recommended at intervals of two or three years, for the maintenance of the size, beauty, and richness of the flowers; but this may be effected by taking up the roots, digging the bed over, and adding some decayed manure to enrich the soil and nourish the plants in the following spring.

The tuberous roots of the anemone may be obtained from any nurseryman or seedsman from September to March. There are some named sorts, such as "The Bride," with white blooms, &c., but for these reference must be made to any dealer's catalogue.

Anemones are usually regarded as spring flowers, and most undoubtedly always flower best at that season. In certain soils and situations, however, the tendency to growth and flowering in anemones is such that they have no sooner died down after spring-flowering, than they throw out fresh leaves and flower again in autumn. This, however, is not desirable, for it weakens the tubers, and the flowers soon degenerate. Autumn-flowering may generally be prevented by excluding light and air from the beds, by means of heavy top-dressings of well-rotted manure during the summer months.

Many persons will take up anemone tubers as soon as the leaf has died down; but this is not necessary, nor is it a good plan, unless the soil of the bed requires renovation, for the tubers will not keep many days out of the ground. The finest flowers are generally produced the first spring after a new sowing; but soil and situation have always a great effect upon them.

HARDY ANNUALS.

For hardy annuals, and for annuals generally, any ordinary garden soil is good enough, and indeed better than rich soil, for this tends to produce luxuriance of growth, which is incompatible with the production of flowers. Very hardy annuals may be sown in autumn, not earlier than the last week in August, and not later, even in sheltered spots, than the last week in September. Autumn-sown plants, if they survive the winter's frosts, will bloom early in spring. The situ-

tion best suited for autumn sowing is one that is sheltered from strong and cutting winds, but free from shade, and well exposed to the sun. Spring sowings for blooming in summer may be made at any time from the middle of March to the middle of April, due regard being had to situation, and later sowings for flowering in autumn should be made from the middle of May to the middle of June.

To raise annuals for transplanting, they may be sown in beds in the reserve garden or elsewhere, and removed, when about half grown, to the positions in which they are intended to flower. The transplanting of annuals, unless very carefully done, is always attended with some danger; but this may be obviated if they are raised in pots, from which they can be turned out without disturbing the roots, or sown on pieces of turf turned grass downwards, the seeds being covered with a thin coating of mould after they have been sprinkled on the turf. Hardy annuals sown in spring, and some kinds sown in autumn, need no protection from the weather. Before sowing seed, slightly tread or beat the ground, to impart some degree of solidity to it, and prevent it from sinking; rake the surface and sow the seed, sprinkling it evenly over the space to be covered, and complete the operation by scattering or sifting some fine mould over the seed, regulating the depth according to the thickness of the seed, the general rule being that the depth of mould over the seed should in every case be no greater than its own depth or thickness. After the young plants are of a sufficient size, thinning must be resorted to in order to prevent them from being drawn into straggling growth by remaining in too thick masses. Annuals that require support, such as sweet peas, &c., must have sticks placed among or around them, and climbers, such as *tropaeolums*, *convolvulus major*, &c., must be supported and trained. In very

dry weather a little watering may be found necessary, and withering or withered flowers should be removed, unless it is desired to save seed, in order to induce fresh blooms and to prolong the time of flowering.

The following is a list of hardy annuals, the most hardy having a star attached to them. The ordinary or familiar garden name is given where it can be, with the height in inches, and the colour of the flowers, or colours, when the blooms are not restricted to one tint only, but are of various hues. Strictly speaking, all flowers mentioned in the lists to follow, are not annuals in the countries from which they have been first obtained, but they will not survive the inclemency of the British winter, and are, to all intents and purposes, annuals when grown in the open-air in this country.

- Adonis flos (or Festivalis)*, 12, deep crimson.
- Agrostemma cili-rosea*, 12, rose colour.
- Alyssum calcinum* (*Sweet Alyssum*), 6, white.
- " *maritimum*, 8, white.
- Amaranthus caudatus* (*Love-lies-Bleeding*), 30, crimson.
- " *hypochondriacus* (*Prince's Feather*), 30, crimson.
- Agemone grandiflora*, 30, yellow.
- Bartsia aurea*,* 15, bright yellow.
- Calandrinia grandiflora*, 12, rosy violet.
- " *speciosa*, 6, violet-crimson.
- " *umbellata*, 6, rich crimson.
- Calliopsis bicolor* (*or tinctoria*), 24, yellow, with purple-brown blotch at base.
- " *bicolor nana*, 12, similar to preceding.
- " *coronata*, 24, orange, spotted brownish purple.
- " *Drummondii*, 12, orange-yellow, with crimson-brown eye.
- Campanula Allica*, 6, blue, with white centre.
- " *Loreyi* (*or ramosissima*), 12, blue, white.
- " *speculum* (*Venus's Looking Glass*), 8, blue, white.
- Centaurea Americana*, 36, red.
- " *cyanus* (*Bluebottle* or *Cornflower*), 24 to 36, blue, white, crimson, brown.
- " *depressa* 12, blue, with brownish-red centre.
- Centranthus macrostiphon*, 15, red, pale rose, white.
- Clarkia pulchella*,* 18, purple, rose and white.
- " *elegans*, 18, crimson, rose, white.
- Chrysanthemum coronarium*, 24, yellow and white.
- " *tricolor*, 24, yellow round purple disc.
- " *Burridgei*, 24, yellow.

- centre and pure white edge, with bright crimson band intervening.
- Cochlearia acaulis*, 3, pale lilac.
- Collomia biocellata*, 9, purple and white.
 " *grandiflora*, 9, lilac and blue.
 " *tricolor*, 9, purple, lilac, and white.
- Collomia coccinea*, 12, bright scarlet.
- Convolvulus tricolor* (or minor), 12, yellowish centre, white and blue, purple, white striped, &c.
- Coreopsis*. See *Calochortus*.
- Delphinium Ajacis** (*Rocket Larkspur*), 18, blue, pink, red, white, single and double.
 " *cardiopetalum*, 12, dark blue.
 " *simeonei*, 12, brilliant blue.
- Dianthus Sinensis* (*Indian Pink*), 12, various.
- Erysimum Pteroskianum*, 18, orange.
- Eschscholtzia crocea*, * 12, deep chrome yellow.
 " *Californica*, 18, brilliant yellow, orange, towards centre, orange, pale primrose approaching white.
tenuifolia, 9, pale yellow.
- Eucharidium concinnum*, 12, dark red.
grandiflorum, 12, rosy purple.
- Eutoca viscidula*, * 12, blue with white eye.
- Flos Adonis*, 9, blood red.
- Gilia liniflora*, 12, white.
 " *tricolor*, 12, purple, white and yellow.
- Godetia*, many varieties, 18, rosy crimson, white, &c.
- Godetia*, "Lady Albemarle," 18, large rosy-crimson blooms.
- "Lady Satin Rose," 18, deep rose-pink, with satiny surface.
- "The Bride," 18, white with purple eye.
- Helianthus annuus* (*Common Sunflower*), 72, yellow.
 " *argyrophyllus*, 60, yellow, silvery leaves.
 " *Californicus*, 84, orange.
 " *centrochlorus*, 48, yellow, green centre.
 " *cucumerifolius*, 72, golden yellow, purple centres.
 " *globosus fistulosus*, 60, saffron, double.
- Helichrysum compositum* (*Everlasting Flower*), 18, various colours.
- Hibiscus Africanus*, 18, pale yellow, with crimson centre.
- Iberis amara* (*Candytuft*), 9, white.
 " *hesperidiflora* (*Rocket Candytuft*), 12, pure white.
 " *umbellata*, 12, purple.
- Larkspur*. See *Delphinium*.
- Lathyrus odoratus* (*Sweet Pea*), various colours, as "Invincible Black," dark rich colour; "Inincible Scarlet," intense scarlet; "Crown Princess of Prussia," lovely blush; "Clarke's Hybrid," rose, blue, and white; "Painted Lady," red and white.
- Leptosiphon androsaceus*, 9, rose, white, yellow.
 " *aureus*, 9, rich yellow.
 " *densiflorus*, 12, pale purple, white.
- Limnanthes alba*, 6, white.
 " *Douglasii*, 8, yellow and white.
- Linaria triornithophora*, 24, *Antirrhinum*-like flowers, reddish violet and purple, spotted yellow.
- Linum flavum* (*Yellow Flax*), 10, yellow.
 " *grandiflorum*, 12, blue flax plant.
 " *ruberum*, 9, crimson.
- Lupinus*, 12 to 36, many varieties, purple, lilac, white, violet, yellow, blue, red, and brown.
 " *Hartwegii*, 24, blue and white, white.
Malcolmia maritima (*Virginian Stock*), 6, lilac, red.
 " *bicolor*, 6, lilac and white.
- Malope grandiflora* (*Mallow*), 36, red.
alba, 36, white.
- Matthiola* (*Stock*), "Dwarf German Ten Week," various colours; "Large Flowered German Ten Week," 18, various colours; "New Autumnal," 15, various colours.
- Monolopia Californica*, 6, deep yellow.
- Nemophila discoidalis*, 9, maroon and white.
 " *insignis*, 6, sky blue and white.
 There are other varieties of this plant, variously coloured.
 " *maculata*, 6, white, blotted with purple.
- Nigella hispanica* (*Love in a Mist*), 18, dark violet.
- Oenothera biotata* (*Veitchiana*), 6, lemon colour, with blood red spot at base.
- Oenothera Drummondii nana*, 12, golden yellow.
 " *Lindleyana*, 12, white and red.
rosea, 12, purplish rose.
- Omphalodes linifolium* (*Venus's Navel Wort*), 12, white spikes of bloom.
- Papaver caryophylloides* (*Carnation Poppy*), 30, various colours, and crimson scarlet.
 " *Marschallii*, 24, white tipped, blood crimson.
 " *Rhæas plena* (*Dwarf French Poppy*), 24, various colours; double flowers.
- Perilla Nankinensis*, 18, pink, with maroon-bronze foliage.
- Phlox Drummondii*, 12, pure white, pink, buff, purple, crimson, some with eye in centre, and some striped.
- Portulaca grandiflora*, 3, various colours.
- Reseda odorata* (*Mignonette*), 9. Flowers small and insignificant, but remarkable for fragrance.
- Rhodanthe atrosanguinea*, 15, magenta-purple.
 " *maculata*, deep rose, with yellow centre surrounded by crimson ring; white.
 " *Manglei*, 12, silvery rose, with yellow centre.
- Salpiglossis coccinea*, 36, various colours.
- Saponaria alba*, 9, white.
Calabrica, 9, pink, compact.
- Schizanthus Grahami*, 18, red or orange, streaked with purple.
 " *pinnatus*, 15, purple and white.
retusus, 18, red and yellow.
- Schizopetalon Walkeri*, 12, white, almond scented.
- Schortia Californica*, 9, yellow, with dark centre; useful for masses; better sown later in the season.
- Silene pendula*, 12, rosy pink.
- Sphenognyne speciosa*, 15, yellow, with purple centre.
- Statice Bondielli*, 18, golden yellow.
- Sunflower*. See *Helianthus*.
- Stock*. See *Matthiola*.
- Sweet Pea*. See *Lathyrus*.
- Tagetes signata pumila*, excellent as bedding.

HALF-HARDY ANNUALS.

plant, 9, yellow with brown spots; better sown in April.

Tropaeolum majus (*Common Nasturtium*), 72, many colours, from straw colour to the deepest brown.

Venus's Navel Wort. *See* *Omphaloïdes*.

Virginian Stock. *See* *Malcolmia*.

Veronica syriaca (*Syrian Speedwell*), 9, blue; pretty for margins; sow where it is to flower.

Viscaria ciliata, 12, bright rose.

„ *elegans picta*, 12, crimson and scarlet, with white edge.

„ *oculata*, 9, pink, dark eye.

„ *coccinea*, 9, scarlet, dark eye.

„ *splendens*, 12, rose pink.

The above list comprises an excellent variety of hardy annuals, and, if not absolutely exhaustive, is sufficient for all general purposes. For other sorts, reference must be made to the catalogues of the leading seedsmen. They are beautiful for masses in borders, edgings, small beds, patches, and single lines. A few cultural remarks on some of them may be useful. By cutting off the flowers of *Erysimum Perofskianum* as soon as they fade, and thus preventing it from running to seed, it may be kept in bloom throughout the summer. The varieties of *Clarkia* are so beautiful that all mentioned above should be grown. *Convolvulus major* is not included in the above list, because it is best raised in heat with the half-hardy annuals.

HALF-HARDY ANNUALS.

Sow the seeds in March or April, in pots or pans, and shelter them in a pit, or plunge the pots in moderate bottom-heat, such as a hotbed that is cooling. The temperature should not rise above 75° by day, or fall below 55° at night. Shade the seedlings from strong sun, give plenty of air when the weather is favourable, and thin out if too close together in the pots. Harden off gradually, and remove to flowering quarters about the middle of May, but delay the removal to the end of the month if the weather be cold and unfavourable.

The best of the half-hardy annuals, which require to be raised either in gentle

heat, or under protection of some kind, and which should be transplanted to their blooming quarters when the weather permits, are included in the following list. When used for grouping purposes, they should be pushed on and potted singly into small 60-sized pots previous to planting. Some of them are very neat continuous flowering plants, and if cut back several times during the summer, form nice compact masses of bloom.

Abronia umbellata, 6, rosy lilac.

Ageratum Mexicanum, 9, lavender blue, white. Half-hardy annual out of doors, perennial in greenhouse, provided that seed is not allowed to ripen. The best dwarf varieties produced by

Imperial Dwarf, 9, porcelain blue.

Lady Jane, 9, porc'ain blue, free flowering.

Queen, 9, silvery grey.

Snowflake, 9, white, free flowering.

Swanley Blue, 6, very rich deep blue.

Alonsoa Warszewiczi, 18, bright scarlet.



Anagallis grandiflora, 6, deep blue, vermillion red. „ *linifolia* or *Monelli*, 9 to 12, many varieties, blue, red, maroon, scarlet, purple with yellow eye.

Aster Sinensis (*China Aster*), 15, blue, red, white. Many varieties variously distinguished. *Balsamina impatiens* (*Balsam*), 18, various colours.

Brachycome iberidifolia, 10, lavender, white.

Canna Indica (*Indian Shot*), mostly 36 to 72, various, of many different colours, scarlet, yellow, &c., and remarkable for foliage. Among these, *C. I. Bihorelli* and *C. Indiflora Ehemanni* may be specially recommended.

Cianthus Damperilii, climber, scarlet and black. „ *punicinus* (*Glory Pea*), climber, scarlet.

Clintonia pulchella, 4, blue, with yellowish eye.

Cobaea scandens, climber sending out shoots so to 30 feet long; purplish bell-shaped flowers.

Datula ceratocalyx, 24, white, tinged with rose.

„ *fastuosa*, 30, purple, red, and white, &c.

ANTIRRHINUM—AQUATIC PLANTS.

- Datula humilis flore-pleno**, 18, golden yellow, flowers double and scented.
 " **stramonium** (*Thorn Apple*), 18, white.
 " **tatula**, 24, deep lilac.
 " **Wrightii**, 24, white, edged with lilac.
Dianthus Sinensis (*Indian Pink*), 12 to 18, various. The variety known as *D. S.* (or *Chinensis*) *Heddwigii* is perhaps the best.
Gaillardia picta, 15, rich claret, gold edge.
Helichrysum bracteatum (*Everlasting Flower*), 2 to 3, yellow, orange, brown, and all shades of red.
 " **orientale** (*The French "Immortelle"*), 2, primrose-yellow.
Ipomoea bona nox, tall climber, as are all the *Ipomoeas*; rose, deepening to violet.
 " **coccinea**, 70, scarlet. There is a yellow variety.
 " **purpurea** (*Convolvulus major or Morning Glory*), 70, white, striped, red, purple, &c., in all shades and tints.
Lobelia erinus, 6, light blue. Other varieties are *L. e. speciosa*, blue, with white eye, and *L. e. alba*, white.
 " **pumila**, 6, deep blue. Many varieties produced by cultivation, but perpetuated by cuttings to preserve strain.
 " **ramosa**, 12, deep blue.
Lophospermum scandens, 72, rosy purple.
Mathiola annua (*Ten Week Stock*), 15, various.
 " **Greca** (*Intermediate Stock*), 15, various.
Mesembryanthemum tricolor, 4, rose and white.
Oxalis rosae, 6, bright pink, greenish at base.
 " **tropaeoloides**, 8, golden yellow, with foliage of dark brownish purple.
 " **Validiana**, 8, dark yellow.
Perilla Nankinensis. See List of Hardy Annuals.
Phlox Drummondii. See List of Hardy Annuals.
Rhodanthe Manglesii, 12, rose, with yellow centre. All the *Rhodanthes* are everlasting flowers.
Ricinus Afric anus (*Castor Oil Plant*), 8, remarkable for beauty of foliage.
Salpiglossis coccinea, 36. Flowers funnel-shaped, with ground of whitish yellow, brown, pink, scarlet, or crimson, marked with blue, yellow, or brown.
Schizanthus. See List of Hardy Annuals.
Senecio elegans, 12, crimson, pink, white.
Stocks. See List of Hardy Annuals.
Tagetes erecta nana (*Dwarf African Marigold*), 9, deep yellow.
 " **patula** (*French Mat gold*), 12, brown and yellow.
Tropaeolum Canariense, 10, canary yellow.
Zinnia elegans, 24, scarlet, with dark purple disc.
 " **Mexicana**, 12, bright orange.

ANTIRRHINUM, OR SNAP-DRAGON.

The Antirrhinum is a hardy perennial, and one of our most useful border plants. The more recently improved varieties of this valuable genus are large finely shaped flowers of the most brilliant with beautifully marked throats;

they succeed in any good garden soil, and are very effective in beds. The smaller kinds are valuable for rockwork and old walls. It is of no use to enumerate



ANTIRRHINUM, OR SNAP-DRAGON.

named varieties, but the reader is referred for these to Mr. John Forbes, of Hawick, N.B. Plants yielding blossoms of all sorts of colours may be obtained from a single packet of seed.

AQUATIC PLANTS.

Vegetation of an interesting character will always be found in the neighbourhood of water, and advantage should be taken of all facilities that offer themselves for the culture of aquatic plants. There are, however, many plants which are to be preferred to others in undertaking the culture of aquatic plants in a piece of water, whether large or small, or the margin of a stream. Flowers for water are of two kinds—plants to be placed in the water itself, usually called aquatic plants, and marsh plants to

are propagated, some by seed and some by division of the roots. The seeds when sown must be placed under water : in other respects aquatic plants require the same general treatment as other herbaceous plants.

Many of the aquatic plants will do well in damp and moist situations, such

as *Butomus umbellatus*, *Caltha* &c., and many marsh plants, as may be inferred from the preceding list, will thrive and flourish in damp, moist shady spots, in which other perennials would languish and ultimately perish. That this is true is evident from the Arum lily, which is an aquatic plant, or in other words, a plant that will grow in water, yet it does well as a pot plant set in ordinary soil, provided that it be watered freely, which keeps the soil in a condition similar to that of marsh land, and receives protection in a cool or even cold greenhouse in winter.

To those who may be desirous of ornamenting any piece of ornamental water, the following lists will be found invaluable. The situation best adapted for hardy aquatics will be found to be in accordance with their height. Many that are not hardy may be introduced for summer decoration in pots sunk either wholly or half deep in water. These can be removed in winter to warm-water tanks under cover of glass. Every year something new in aquatics is being introduced, for the water plants of the tropics are inexhaustible, and very many of them supremely beautiful. Most of the plants which are mentioned in the following lists prefer a shady and sheltered situation, and will be found flourish best when protected by overhanging trees. Rock-work and root-work form admirable receptacles for plants on the margins of streams, and afford all the protection they require when properly arranged. It may be said that aquatic plants out-of-doors flower from May to August. Those that require protection in winter, and that on this account are grown in pots, which are plunged in water, will flower earlier; thus the Arum lily, *Richardia* or *Calla* *Ethiopica*, will flower from Christmas to Easter, within doors. Aquatic plants requiring protection in winter are marked with a star.

These plants, whose height is not given, have leaves and flowers floating on the surface of the water.

The following list comprises all the aquatic plants that are most deserving of notice and culture. The height, when given, is in inches.

- Acorus calamus* (*Sweet Flag*), 36, yellow.
 - Alisma plantago* (*Water Plantain*), 24, rosy white.
 - Aponogeton distachyon*,* white, marked with black, sweet scented.
 - Arum, *Ethiopicum** (*Arum or Trumpet Lily*),* 14 to 36, pure white. This plant is sometimes called "Calla," or "Richardia."
 - Butomus umbellatus*, 24, rose.
 - Nuphar adorna*, yellow, with red anthers.
 - " *luteum* (*Yellow Water Lily*), yellow.
 - Nymphaea alba* (*White Water Lily*), white.
 - " *adorata*, white.
 - Pontederia cordata*, blue, in fine tufts.
 - Ranunculus aquatilis*, white.
 - Sagittaria latifolia*, 12, white.
 - Calla *Ethiopica**. See *Arum *Ethiopicum**.
 - Caltha palustris*, 12, yellow.
 - Hottonia palustris* (*Water Violet*), 18, lilac with yellow.
 - Iris pseudacorus* (*Yellow Iris or Water Flag*), 24, yellow.
 - Limnocharis Humboldtii*,* yellow
 - " pink.
 - Thalia dealbata*, 40, blue, purple.
 - Tropaeolum* (*Taratea*), white, with purple claws.
 - Trianaea Bogotensis*, fine glaucous leaves.
 - Vallisneria spiralis*, white, with green strap-like leaves.
 - Villarsia nymphoides*, golden yellow.
- In addition to those already mentioned may be named a few marsh plants of handsome appearance that are suitable for planting on the borders of streams and the margins of ponds and ornamental pieces of water:—
- Arundo donax*, 120, remarkable for its foliage.
 - Hemerocallis fulva*, 24, tawny yellow.
 - Houttuynia cordata*,* 12, yellowish green.
 - Iris foetidissima* (*Stinking Gladwyn*), 30, bluish lilac.
 - Lythrum roseum superbum*, 36, rose colour.
 - Mosotis palustris*, 9 blue, with yellow throat.
 - Ananthe crocata*, 42, white.
 - fistulosa*, 24, white.
 - blue.
 - Senecio paludosus*, 42, yellow.
 - Scrophularia aquatica*, 42, red.

AQUILEGIA, OR COLUMBINE.

A pretty herbaceous perennial of which many beautiful hybrid varieties have been recently introduced. Seeds of these can be obtained of any nurserymen, and should be sown in March in any ordinary garden soil.

ARBUTUS, OR STRAWBERRY TREE.

A beautiful shrub, which is found in the greatest perfection in the West of Ireland, and along the south coast of Devon and Cornwall. There are many varieties, but the best known is *Arbutus Unedo*. It bears a small cup-like blossom in clusters, and a round berry varying in tint from orange to red. This berry may be eaten, but there is not much flavour to recommend it. It may be raised from seed. The rarer varieties may be budded or inarched on *A. Unedo*, for which any ordinary soil will do.

ARDISIA.

Stove shrubs, several of which will flourish and fruit in a moderately warm greenhouse. All require loam and peat; and they may be increased by cuttings, which root very freely in sand. *Ardisia crenulata* is a very favourite variety. Its bright red berries, which last so long, render it invaluable in a conservatory.

ARISTOLOCHIA.

A handsome deciduous climber with large cordate or pear-shaped leaves. Some varieties, such as *Aristolochia Sipho* are hardy and require no protection, but others are only suitable for the greenhouse, for which they form good pillar plants. The climbers are propagated by division of the roots and by layers, in spring and autumn; and the herbaceous perennials also by division of the roots. These plants prefer a good sandy loam, but peat and loam must be used for the greenhouse varieties.

ARUM.

This splendid plant, with its snow-white flower, its yellow tongue and arrow-shaped leaves is not hardy with us; but it admits of an easy cultivation even where there is no greenhouse, and it is so ornamental in a room or hall, that it is well worth the little trouble which it requires. The Arum grows freely from offsets, which are very freely produced. The plants should be repotted every October, in rich, light mould, with a few drainers, the offsets having been carefully removed, and all the old soil well shaken from their roots.



ARUM ITALICUM.

From this time till June, or earlier, if the plants have flowered and are off blooming, they should have abundance of water; but after this they must be kept quite dry, and may be put away in an outhouse till the following October, when the same treatment should be renewed. The Arum, in a growing state, requires so much moisture that it is best to keep the pot always standing in a deep saucer full of water. Under this culture, offsets may be brought into flower in their third year.

Other varieties are *A. crinitum*, *A. dracunculus*, *A. Italicum*, and *A. maculatum*, also known as "Lords and Ladies," or Cuckoo Pint. All are hardy perennials and suitable for outdoor growth, requiring protection only in the winter, in the form of a little litter thrown over the places

where they grow. This plant is also known as *Arum Aethiopicum* and *Nichardia*

Plants of this family are mostly hardy herbaceous perennials, with fleshy fasciculated roots. The flowers are either white or yellow, and grow on long footstalks,



YELLOW ASPHODEL.

forming stately spikes of bloom. They will grow in any kind of soil, but a rich sandy loam is best fitted to bring them to perfection. They are propagated by division of the roots.

ASPIDISTRA.

Plants bearing broad lanceolate leaves on long stalks. The flowers are very small and insignificant, and grow close to the ground. They grow in ordinary soil, and are propagated by suckers. *Aspidistra lurida* is the best known, and is one of the few plants that are uninjured by the fumes of gas.

ASTERS.

This splendid class of half-hardy annuals is not only one of the most popular, but also one of the most effective of our garden favourites, producing in profusion flowers

in which richness and variety of colour are combined with the most perfect and beautiful form. The Aster is indispensable in every garden or pleasure-ground where an autumnal display is desired. In our flower-beds and mixed borders it occupies a deservedly prominent position, whilst for grouping or ribboning it stands unrivalled.

The Aster may be divided into two sections—French and German. The French, as improved by Truffaut, has flat petals either reflexed or incurved; the former resembling the Chrysanthemum, whilst the latter, turning its petals towards the centre of the flower, forms, when well grown, a perfect ball, and is best described by its resemblance to the peony. The German varieties are quilled, and the most perfect flowers are surrounded by a circle of flat or guard petals, as in the hollyhock. The flowers of these are particularly admired for the exquisite symmetry of their form. The dwarf bouquet varieties of this beautiful plant grow from six to nine inches high, and are particularly adapted for small beds, edgings, or for pot-culture; they often flower so profusely as to entirely hide their foliage. All the varieties delight in a deep, rich, light, soil, and in hot, dry weather should be mulched with well-rotted manure, and frequently supplied with manure-water; this labour will be amply repaid by the increased size, beauty, and duration of the flowers.

Culture.—Sow about the first week in April, and sow for succession twice more at intervals of a fortnight. Sow in boxes or pans in light, rich, soil, and place under glass in a situation at once airy and sunny. Prick out in pans or boxes, when large enough to handle, using again a rich, light soil, and in about three weeks' time, when they have developed into sturdy plants well furnished with fibrous roots, transplant to the quarters in which they are to bloom. The soil should be dressed with well-

rotted manure, and until the plants begin to show flowers a little weak liquid manure may be given with advantage.

AUBRIETIA.

Pretty evergreen trailing plants, of which the best known *Aubrieta purpurea*, is useful for edging to borders, and for rock-



AUBRIETA PURPUREA.

work, &c. They are propagated by division of the roots in spring or autumn. A light sandy soil is best suited for them.

AUCUBA, OR VARIEGATED LAUREL.

A hardy evergreen shrub, originally brought from Japan, well suited for gardens in large towns in which the air is too often too close and smoky. They may be grown in pots for decorative purposes, but do well out of doors in any ordinary soil. Propagated by cuttings in spring and autumn set in fairly light soil.

AURICULA.

Classification.—This attractive flower, which is one of those that are popularly known as florists' flowers, has been brought by cultivation to a high degree of perfection. Auriculas are divided into two classes, namely, Show Auriculas and Alpine Auriculas, the latter being more hardy and easier to grow and manage than the former. The distinction between Show Auriculas and Alpine Auriculas is easily explained. Taking a *pip*, or individual flower, from the *truss*, the name given to

a collection of pips on one large flower stalk, we find round the central tube, or *thrum*, a circle of white, which is called the *eye* or *paste*; surrounding this is another band, called the *ground colour*, and beyond this again another zone called the *margin* or *edge*. Show Auriculas are classed according to the colour of the edge, being *White-edged*, *Green-edged*, and *edged* varieties. If there be no edge the ground colour, it is called a *self*. Thus there are four classes of Show Auriculas. In the Alpine Auriculas the *eye* or *paste* is yellow; there is no edge, but the ground beyond the eye is generally shaded, the lighter colour near the eye deepening in some to a darker colour or shade round the edge.



AURICULA.

Soil, &c.—Various composts have been recommended for the auricula, but the best seems to be a mixture of one part of good fibrous loam, and one part of well-decayed spent manure, with a liberal addition of road sand or silver sand, and a sprinkling of charcoal or wood ashes. The pots must be well drained, and small pots should be used, the auricula never doing so well in large pots as in small ones. Thus 4-inch and 5-inch pots are large enough for any full-sized plants. Seedlings and small plants should, of course, be placed in much smaller pots.

Propagation, &c.—When it is desired to raise plants from seed, the seed should be

sown in pans at any time from January to March, on the surface of light rich mould, well drained, or a compost of leaf mould and sand. Moss should be kept over the surface of the soil till the seedlings are up, to prevent it from drying too quickly, and the moss should be kept moist by sprinkling with a fine syringe. When the seedlings have three or four leaves, transplant into 3-inch pots. Propagation by offsets, or division of the roots, may be effected in February or March, when vigorous growth is being made, or in August, just when fresh growth is commencing after repotting. If the offsets can be removed with roots attached to them, so much the better. They may be placed singly in 3-inch pots, or these may be placed in a larger pot at equal distances near the edge.

Management in Summer.—The auricula blossoms and is in full growth from February to June, when the plants should be removed from the glazed shelter under which they have been flowering, and placed in the open air on a shelf or stage, having a north or north-east aspect. Under a north wall or hedge is a good situation. The plants should not stand on the ground itself. In August, when the fresh growth, especially the emission of fresh roots, commences, the plants should be repotted, the tap root being shortened with a sharp knife. A depth of $\frac{1}{2}$ inches should be first filled with small pieces of broken pots, and on this some decayed leaves. The plant should then be introduced, and the pot filled with compost to about $\frac{1}{2}$ inch from the rim of the pot. Care should be taken not to allow the collar of the plant to be below the soil. Press firmly, give a little water to settle the soil about the roots, at the expiration of seven or eight days water again sparingly, and then leave the plants to themselves until November.

Management in Winter.—In November the plants may be removed under shelter,

the shelter being merely that of a glazed roof and sides sufficient to prevent wet, but not air, from reaching the plants. When they begin to grow in February, or a little later, they should be watered sparingly, the quantity being increased when the blooming period commences in April. Care should be taken never to allow any water to fall on the foliage, or to settle on the leaves at the base, as this frequently causes decay, and all dead and decaying leaves should be removed from the plants. These directions bear more especially on Show Auriculas, but they are equally applicable to Alpine Auriculas, although these are less susceptible of injury from moisture, and may be grown in the open border. In February, top dress all auriculas in pots.

There are in each class many varieties of named plants, but to give a list in detail would take up too much space. Readers are recommended to raise their own plants from reliable seed obtained from florists.

AZA'LEA.

Beautiful flowering plants, natives of North America, Turkey, and China. The azaleas common in our gardens are deciduous shrubs, varying in height from 2 ft. to 6 ft. The loftiest of them is *Azalea arborens*, which will grow from 10 ft. to 15 ft. in height. With azaleas, as with rhododendrons, the best garden varieties are hybrids.

Azaleas are distinguished as Ghents on American azaleas and Indian or Chinese azaleas. The former are more suitable for open-air culture, but for conservatory decoration the Chinese and Indian azaleas are most important. The azaleas that thrive out of doors are hybrids from *Azalea viscosa* and *A. Pontica*; they are grown in sandy peat mixed with a little loam, a compost which is suitable for all

varieties. For use in the conservatory *A. Indica alba* and its hybrids are grown. For flowering in December an early habit must be induced, which may be effected by merely placing them in the conservatory in the autumn. They require a similar growing season, after flowering, to the camellia; and until the shoots are sufficiently numerous, or the plants as large as desired, they can be grown on throughout the entire year, and stopped four or five times during that period. This pushing treatment will, however, sacrifice the blossom; but if the plants are started early, they can be stopped twice, and yet the terminal buds be sufficiently matured in the autumn to develop flower-buds. After the growth is made, the plants should be gradually hardened off, and be placed during September full in the sun's rays out of doors, to thoroughly ripen their wood. Two parts of peat, two of loam, a sprinkling of sand, and one-sixth part of charcoal that has been steeped in urine or other manure-water suits them well. The drainage should be carefully attended to, the pots being filled to at least one-fourth their depth with crocks. While growing, they will also bear watering with clear weak manure-water every time that they become dry. Azaleas may be removed from the house in June and transferred to a cold frame, or be plunged in an open border until October, when they should again be brought into the conservatory or cool greenhouse. Before housing them for the winter, examine the plants, and dip them into a tumblerful of equal parts soot-water, made by throwing half a bushel of soot in soap-suds, and tobacco-water. Repeat this dose three times, and every thrip will either take itself off or die. Indian azaleas bear forcing well, and by inducing an early habit by the aid of the forcing-pit, the luxury of their beauty may be enjoyed in the conservatory or the sit-

ting-room for as much as six or eight months of the year.

Azaleas should be growing freely in January, if they have been shifted and promoted to a warm place in December. To get early flowering plants some of the more advanced specimens should be introduced to greater heats, while others are retained for a succession to supply the conservatory or window cases.

BALSAM.

Magnificent half-hardy annuals for conservatory or out-door decoration, producing gorgeous masses of brilliant flowers. Sow in pits in frames in March. When grown in pots, and large specimens are desired, they should be shifted into 10 or 12-inch pots, using the richest compost at command, and the pots plunged in spent hops or tan, and liberally supplied with manure-



BALSAM.

water; when used for out-door decoration, the soil should be rich, the plants supported with neat stakes, and liberally supplied with manure-water. There are many beautiful varieties of recent introduction known as "camellia flowered" balsam, chiefly white, rose, crimson, violet, scarlet, &c., diversified by spots and shapes of white, and other colours named above.

BEDDING PLANTS.

Plants commonly known under the name of bedding plants consist of the common scarlet and other geraniums, verbenas, petunias, calceolarias, lobelias, and others; indeed all sorts of trailers and creepers used for covering beds in summer and autumn are so named. Most of these latter require pegging down; and in wet seasons, when the plants are apt to run too much to leaf, the lower extremities of the shoots may be slightly bruised, which will check their growth and promote flowering. Beds for all the ordinary bedding plants should be well drained, and the soil light and rich.

To grow bedding plants in perfection, the beds should have a dressing of manure annually, or a heavier application every second year. It would be almost as reasonable to attempt to grow two crops of cabbages in succession, without enriching the soil, as two crops of bedding plants. Many of them exhaust the soil more than any crop whatever; and to grow them rapidly, and in perfection, the beds must be liberally manured.

MANAGEMENT OF.

Bedding-out plants are plants which will thrive and do well in the open air in summer, but which require protection during the winter. Half-hardy annuals are found among them, but they consist for the most part of herbaceous plants, which are, or may be, propagated by cuttings. The propagation of many of these plants, which are favourite tenants of the greenhouse and conservatory, will be touched on in the special articles devoted to their culture under the name of each as heading. Speaking generally of their management as a class, it is desirable that all cuttings taken in the late summer to become rooted before the arrival of

winter, should be taken early enough to allow of the formation of a good mass of roots before the plants are consigned to winter quarters. Thus, the best time for taking cuttings of geraniums, verbenas, &c., is from the middle of July to the middle of August, during which time they may be stuck in the open border or a close frame, but when deferred to September the cuttings should be plunged in slight bottom heat. Calceolarias, however, may be subjected to different treatment. The cuttings may be taken in September, and even later, and they may be wintered with no more protection than that which is afforded by a cold frame.

BEDDING PLANTS, HARDENING OFF AND PLANTING OUT.

No plant that has been an inmate of a cold frame or glazed structure of any kind during the winter can be removed from shelter at a moment's notice, and placed with impunity in the open air. Before removal from winter quarters into the beds in which they are to bloom, air should be given as freely as possible all day and every day, weather permitting. By this salutary exposure plants will experience no check when moved out. The transfer of bedding plants to the open may begin about the middle of May, or even sooner, if the weather be warm, but if cold and unpropitious, which is often the case in May, it should be deferred till June. Good soil is desirable for bedding plants, but it should not be too rich.

BEDDING PLANTS, LIST OF

The plants comprised in the following list are those which are most commonly used as bedding plants. It will be noticed that the list comprises plants that may be raised from seeds, as well as cuttings, and some that are tender annuals. It may be said that *Antirrhinums*, *Cerastiums*, *Del-*

phiniums, and Penstemons, being hardy, require no protection in winter, as do the others.

Ageratum,—various sorts.
Alstromerias,—various sorts.

Bouvardias,—dwarf shrubby plants, scarlet, white, &c., scented. Obtained from cuttings, 'spring.'

Calceolarias,—shrubby varieties.

Ceratostomum.

Cineraria maritima,—18, grown chic foliage. Sow under protection in December.

Cuphea platycentra,—12, scarlet, black, and white, with other varieties, from seeds or cuttings.

Dahlrias,—dwarf varieties.

Delphinium formosum,—and other varieties.

Geraniums,—all varieties.

Echeverias,—perennial succulents.

Heliotropum Peruvianum.

Lantanas,—various sorts.

Lobelia,—various sorts.

Lophospermums,—various sorts.

Maurandya Barclayana.

Mimulus,—many varieties.

Nasturtiums,—dwarf varieties.

Nierembergias,—all varieties.

Onotheras,—dwarf varieties.

Penstemons,—of all colours.

Salvias,—many varieties.

Senecio elegans,—various colours.

Tracheliums,—blue and white.

Tropaeolums,—dwarf and double varieties, not climbers.

Verbenas,—various colours.

in frosty weather it should be maintained by gentle fire heat, which, in combination with the admission of the external air, may be made use of to keep the house dry, even in the coldest weather, the presence of the heat mitigating and tempering the coldness of the air that is admitted.

BEDDING PLANTS, WHEN TO TAKE CUTTINGS OF.

As a rule, cutting of all bedding plants are better taken from the middle of July to the middle of August. Geraniums may be rooted in the open border in July and August, and in gentle heat in September, in which month cuttings of calceolarias, and salvias are best taken, though calceolaria cuttings will root in a cold frame if placed therein even as late as November. For cuttings in early spring, old stocks must be placed in gentle heat and induced to grow, and when sufficiently large the young shoots may be taken off in cuttings, to be rooted also in gentle heat. Half-hardy annuals should be sown in July and August, and kept under protection in frames and pits during the winter.

BEDDING PLANTS, TREATMENT OF, IN WINTER QUARTERS.

With cuttings of bedding plants under protection during the winter it must be remembered that vegetation is still going on. They are still growing, though not actively, or perhaps apparently, and therefore they must have light constantly, and air whenever the state of the weather is such as to allow of its free admission and circulation. If due ventilation and circulation of air is prevented, and the atmosphere of the house, frame, or pit is allowed to get unduly moist, the plants will "damp off." The pots in which cuttings are placed for the winter must be well drained, to prevent any stagnation at and about the roots. The temperature should not be allowed at any time to fall below 35°, and

BEGONIA.

There are no plants more worthy of admission into a conservatory than begonias, and the facility with which they may be cultivated is equal to their beauty. If raised from seed, all they require is a good rich loamy soil, mixed with a little sand, and a little bottom heat to start them—say from 65° to 70°. The seeds should be scattered on the surface of the soil, and not buried beneath it. The young plants should be shaded when the sun is hot and the light bright. Either hotbed or stove answers every purpose, provided there is a conservatory or greenhouse in which they can be flowered; the chief requirements being heat, moisture, and shade. Particular

varieties may be propagated by means of leaf cuttings, which consist of well-matured leaves scored with the point of a sharp knife across the larger nerves on the lower side. These should be laid on sand or cocoanut-fibre and held in place by small pebbles or pieces of broken pot. Under this treatment bulblets will form at the ends of the nerves, and these, when large enough, must be removed and potted. The tuberous species are propagated by division of the roots and by

There is a delicious fragrance about some of the species, which particularly recommends them for cultivation; others



are recommended by their richly-variegated foliage and graceful habit, and they all hybridise with great facility. The following are a few choice sorts selected from more than 350 species known to botanists:—

- B. amabilis**, — the bright banded leaves very glossy and shining.
- B. argentea**, — the upper surface of the leaf of a pure delicate white.
- B. fuchsloides**, — remarkable for its graceful habit.
- B. Griffithii**, — richly variegated, with colours shading beautifully into each other.
- B. manicata**, — produces a large mass of flowers at one time in the early spring.
- B. nitida**, — an almost perpetual bloomer, one plant having had three or four cymes of flowers always open for three years.
- B. octopetala**, — a tuberous-rooted winter-flowering, with large pure white blossoms.
- B. umbrosa**, — remarkable for the fragrant odour, from which it derives its name.

B. rex, — a beautiful species, with rose-coloured flowers, and foliage variegated, with dark green edges and centre, and silvery belt between, from which many good varieties with variegated leaves have been produced.

B. splendida, — grown for its crimson velvet young leaves, which lose their beauty, however, as the plant approaches maturity.

B. splendida argentea, — equally beautiful; a pink tinge shining through the silvery hue of the leaves.

B. xanthina, — in which green bands follow the principal veins, the spaces between being pure white.

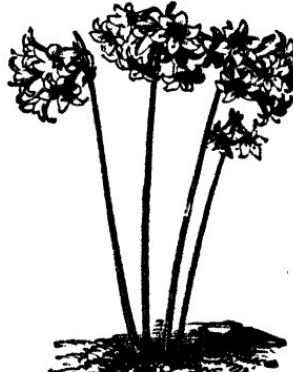
B. xanthina Lazuli, — having copper-coloured leaves, shining with a fine metallic lustre.

B. xanthina pictifolia, — the copper-coloured leaves relieved with large distinct white blotches.

Many other begonias, both distinct species and hybrid varieties, are in cultivation, nearly approaching these in beauty; but few, if any, will be found to exceed them. For named hybrid varieties, which are very numerous, the reader is referred to the price lists of the principal florists and growers, and especially Messrs. James Veitch and Son, Royal Exotic Nursery, 544, King's Road, Chelsea.

BELLADONNA LILY.

This is an amaryllis; the flower, in some cases, is pale pink, and in others almost



BELLADONNA LILY.

white, flushed with rose-purple, very handsome. The bulbs should be planted in

June or July in good fibrous mould^{*} mixed with fine sand and leaf mould at a depth of about eight inches below the surface, and when once planted the bulbs should be left undisturbed. The flower stems are always thrown up first, the leaves appearing at a later period. The bulbs succeed equally well in large pots in a cool greenhouse.

MIA.

An ornamental profuse-flowering half-hardy shrub, the flowers succeeded by reddish-yellow, strawberry-like fruit, which is eatable. It may be grown in the open air in South Devon, Cornwall, or the Scilly Isles, but is scarcely suitable for higher latitudes unless grown against a south wall and in places near the south coast. It likes a rich moist loam, and may be propagated by seeds sown soon after attaining ripeness in a cool greenhouse, or by layers put down about September or October. A good example is found in *Benthamia fragifera*, a species with large cream-coloured flowers, 10 feet in height.

BIENNIALS, LIST OF.

The following is a brief list of biennials, desirable for the garden and borders. Those that are more hardy than the generality of biennials, and need no protection, are distinguished by a star. Those that are not so marked should be protected in cold pits or frames during the winter, and not planted out until all fear of injury from frost has passed. Stocks should be placed in a sheltered border during the winter, and kept there at least until April, when they may be removed to their blooming quarters. It is desirable to winter some stocks in a cold frame in pots, lest the winter prove too inclement for them and they be carried off by frost.

*Companula medium** (*Canterbury Bell*), 24,

*Dianthus barbatus** (*Sweet William*), 15, various.

*Digitalis purpurea** (*Foxglove*), 36, white, purple, both marked with spots. Many varieties. *Hedysarum coronarium*, * *sucklei*, 24, purplish red.

Humea elegans, 60, profuse panicles of red colour.

Ipomopsis (or *Gilia*) *elephantina*, 36, orange, bright red.

*Lunaria biennis** (*Honesty*), 18, violet-purple. Seed pods used as everlasting flowers.

Lychnis coronaria, * 18, rosy purple. Double variety propagated by division after flowering.

Mertensia virginica (*Granner*), red, purple, violet, brown.

Oenothera Lamarkiana, 4, *ta axacifolia*, 15, trailer, white, tinted rose, and sweet-scented. (*Mourning Widow*),

Silene compacta, 18, ros.

Trachelium caeruleum, 18. Plant suitable for

BIENNIALS, MANAGEMENT OF, &C.

The difference between annuals and biennials consists in their nature and habit only. The former grows flowers, yields seeds for its reproduction, and dies in the same year; biennials, on the contrary, are sown and grow in the first year of their existence, but do not come to maturity until the second, when they flower, produce seed, and die. It is but few, if any, annuals that can be propagated by cuttings; but biennials, as, for example, the Sweet William, may be preserved, and the possession of any well-marked variety maintained by pulling down layers and taking off shoots from the base of the plant. Although this and other plants of the same kind, strictly speaking, are biennials, yet, from their capability of reproduction in the manner stated, they are often reckoned among hardy herbaceous plants, and thus it will be most convenient to consider them. Of their culture and management, it is sufficient to say that they are treated in precisely the same manner as annuals. They may be sown, however, at a later period of the year, though not later than the middle or end of September, for plants sown at this time will bloom the

following year as freely as those that have been sown at an earlier date. They should be raised in the reserve garden, and planted out in their blooming quarters in the spring.

BIGNONIA, OR TRUMPET FLOWER.

A magnificent climbing plant that must be raised in a hothouse from side shoots placed in sand, under a bell-glass, and over bottom keep in sunmer, or by cuttings of its roots treated in a similar manner in spring or autumn. When fairly advanced in growth they may be trained over the roof of a cool greenhouse. There are many varieties, all of which are natives of tropical



BRACHYCOME IBERIDIFOLIA.
See vol. 2 of this page

countries, or those in which the climate is very hot.

BOX.

The different sorts of box, *Buxus*, are very ornamental. They do not attain much height; but they grow well in shade, and always look fresh and nice. is the common to which *B. aurea* and *B. argentea*, the gold and silver varieties, form an agreeable change; *B. Balearica* is a good sort, and so is *B. myrtifolia*. *B. s. suffruticosa*, a dwarf variety of the common box, is the sort that is used for the edgings of borders. The box used for the purpose of edging is *Buxus sempervirens*.

BRACHY'COME.

Beautiful free-flowering, dwarf-growing, half-hardy annuals, covered during the greater portion of the summer with a profusion of pretty cineraria-like flowers, very



GREAT QUAKING GRASS.

effective for edgings, small beds, rustic baskets, or for pot-culture; succeeding in any light rich soil. The best known is *Brachycome iberidifolia*, which bears some blue and some white flowers.



BROWALLIA.

BRIZA.

A family of ornamental grasses raised readily from seed sown in March or April. The best known are *Briza maxima*, or great quaking grass, shown in the accompanying illustration, and *B. minor*. This is sometimes called Ladies' Tresses.

BROWAL'IA.

Very handsome, profuse-blooming, half-hardy annuals, covered with beautiful flowers during the summer and autumn months; growing freely in any rich soil. The best known varieties are—

Browallia demissa,—light blue, yellow and orange centre, $1\frac{1}{2}$ ft.

Browallia elata alba,—white, $1\frac{1}{2}$ ft.

Browallia elata cærulea,—sky-blue $1\frac{1}{2}$ ft.

Browallia grandiflora,—pale yellow, large and handsome, $1\frac{1}{2}$ ft.

Browallia speciosa,—purple, very pretty, 2 ft.

BRUGMAN'SIA.

These plants are now included with the Datures, which are the annual species, while the Brugmansias are the shrubby species. The latter are magnificent conservatory plants, with a profusion of large trumpet-shaped highly odiferous flowers; growing freely out of doors during summer; in the centres of beds, mixed borders, or against south walls, they are very ornamental. They require rich soil and plenty of space for their roots, and should be placed in large pots. The chief varieties are—

Brugmansia Knightii,—white, splendid for winter decoration, 2 ft.

Brugmansia suaveolens,—white; flowers 1 ft. or more in length.

BUCKTHORN.

Of this species, however smoky the atmosphere, *Khamnus alaternus*, the common alaternus, and others of the same genus, which are all of quick growth and hardy, will live and do well, provided only they have shelter from the wind.

BUDDING ROSES.

The operation of budding roses may be commenced in June. In selecting buds of roses, take those of moderate size; clean off the thorn, cut the leaves off, leaving only about half an inch of the stalk or petiole to hold by; then with a sharp knife take out the bud, begin-

ning half an inch above the eye, and bring the knife about the eighth of an inch below; with the point of the knife separate the wood from the bark, without interfering with the wood which remains in the eye, leaving it so that, when inserted on the stock, the wood left may be in immediate contact with its wood.

Having removed the thorns on the intended stock, open the bark at the most convenient spot for the insertion, by drawing the point of the knife down the centre of the shoot, and by a cross-cut, where the other begins, raise the corners of the bark sufficiently to introduce the lower end of the bud; press it down till it is opposite to the corresponding bud on the stock, and bind it up with a piece of fine bass or worsted thread, leaving the eye so that it is just visible.

After a lapse of three or four weeks it should be examined, and the band loosened a little. In cases where the bud does not separate freely from the bark, the wood may be tied in also; but the operation is both neater and more efficient when all the wood except that in the eye is removed.

Dull and cloudy weather is generally recommended for the operation; but some operators prefer bright, warm, sunny weather, provided the stocks are in proper condition. Rose-budding may be performed any time from June to September, and even as late as October, August being suitable for the greatest number of roses, the test being of course the maturity of the shoots.

BUD'DLEA.

Deciduous greenhouse shrubs, natives of India and South America. They are not quite hardy enough to endure very severe winters with us out of doors; but in greenhouses they flower profusely. A loamy soil, mixed with peat, suits them best.

There is, however, one hardy variety, *Buddleia globosa*, remarkable for its pretty ball-shaped orange blossoms and lanceolate leaves, pale green above and whitish below. This herbaceous shrub attains the height of 15 feet, and only requires such protection as is afforded by a dry sheltered situation. It may be propagated by cuttings taken from well-ripened wood, in September, placed in good soil under a hand-light, or from seeds, if they ripen on the parent plant.

BUGLOSS.

The Bugloss (*Anchusa*) is a fine showy plant, mostly with large blue flowers. It may be propagated by slips, and by divi-



BUGLOSS.

ding the roots into as many plants as there are heads, when it has done flowering, as well as by seed saved in the autumn, and sown on a warm border in the spring.

BULBS, FORM AND CLASSIFICATION OF.

The management of some special classes of bulbs, such as the crocus, the gladiolus, the hyacinth, &c., are indicated under the names they respectively bear. At present we have only to consider the culture of bulbs generally, some of which may be regarded as herbaceous plants, and which may one and all be classified as such, when we remember that plants of this

kind are those in which a new stem is produced, year after year, from a perennial root, and that the term is applicable to any border perennial whose habit is not shrubby. Strictly speaking, the term "bulb" is applicable only to roots such as the hyacinth, which grows in successive coats superimposed one on and over the other, and the lily, which is formed of scales growing one over the other, as tiles are placed on the roof of a house. From this disposition of the coats in one case, and the scales in the other, of which true bulbs are formed; bulbs following the formation of the hyacinth are said to be *tunicated* bulbs, and those following the formation of the lily are said to be *imbri-cated*. From this it is evident that snowdrops, daffodils, &c., which are similar in construction to the hyacinth, and all that possess the scale-like formation of the lily, are genuine bulbs.

But what of the crocus, the gladiolus, the cyclamen, and other fleshy roots of bulbous forms which have not the construction of either of the classes just described -- are they not bulbs? No, not in the strictest sense of the word; but having the form of bulbs they are commonly accepted as being bulbs, and are included in the list of roots called "Dutch Bulbs," sent over every autumn from growers in Holland to supply the English market. If the root, say, of a crocus, be divided in any way, whether from top to bottom, or transversely from side to side, it will be found that it is a fleshy root without any division whatever in the interior, like the hyacinth, but consisting of one mass throughout like the potato. It differs, however, from the potato in that the roots, by which nourishment is drawn from the soil, are sent forth anew each year, from a ring or circular patch at the base of the bulb, and not from eyes, as in the potato, from which stalk and roots both proceed, the former in an

upward direction, and the latter downwards. Fleshy masses like the gladiolus and crocus, are called corms, to distinguish them from the tunicated bulb of the hyacinth and the scaly bulb of the lily, and masses like the potato and dahlia are called tubers.

BULBS, MANAGEMENT AND CULTURE OF.

As far as these points are concerned, the treatment of all bulbs in the open air, and indeed in pots, is similar to a great extent for every variety. The more hardy kinds, and notably the common garden lilies, will thrive in any ordinary garden soil, fairly worked and fairly enriched; but it is necessary for their welfare that it should be well drained, and in no way waterlogged. Generally speaking, however, a light soil or sandy loam is preferred by bulbs, and if the soil of the garden be at all inclined to be heavy, it is desirable to lighten it by working in sand, at and around each spot in which a clump of bulbs is to be planted; and to add some leaf mould and manure from a spent hot bed, if the soil be poor. Bulbs, as a rule, should be planted deep, especially crocuses, gladioli, and lilies, because the bulbs are then less likely to suffer from the effects of frost. No attempt should be made, after flowering, to remove leaves or flower-stalks until they have withered and decayed to such an extent that they may be removed by a very slight effort. The long sword-like leaves of crocuses, hyacinths, &c., should be neatly plaited together, to obviate untidiness of appearance, and allowed to remain until they are quite decayed. The dead flowers may be, and indeed ought to be, cut off just below the spike of bloom, unless it is wished to save seed. This holds good for all bulbs that have a woody or strong flower stem. When the leaves have completely died

away, bulbs may be taken up and allowed to dry. They should then be kept in a dry place, to which the air has free access, until the time for planting comes round again, which commences in October for hyacinths, &c., and ends in April for late-flowering varieties of the gladioli, the period of planting being regulated in a degree by the period of flowering.

Such, briefly, is the accepted creed with regard to the culture of bulbs, and, for sale purposes, it is absolutely necessary that bulbs should be taken up when their leaves are withered and dried, so that transit from place to place may be effected when they are in this condition, and without tender and succulent rootlets to suffer injury by removal and carriage. But in the amateur's garden, bulbs may be suffered to remain where they are from year's end to year's end, provided that the soil is suitable, the drainage sufficient, and that they are planted deep. Bulbs have a tendency to rise to the surface, especially corms, for in the crocus and gladiolus, though not in the cyclamen, the new corms are formed every year on the top of the old corms which perish. The continuance of bulbs in the places in which they are first planted, leads to the formation of splendid masses, from which at the proper season rise glorious flower spikes, rich in colour, and in some cases endowed with delicious fragrance. Flowers are far more satisfying to the senses of sight and smell when in groups and masses, than they can possibly be as single specimens. What can be more desirable than a clump of hyacinths of all colours—red, white, blue, and yellow—or a dozen spikes, four feet in height, of the old but beautiful white and orange lilies?

LIST OF BULBS.

The following is a list of the principal bulbs now in cultivation in gardens.

It may be considered as a list of perennials, bulbous and tuberous, because it will save space to include the latter kinds without placing them in a separate list. A few plants that might have been included in this list, viewing it as such, have already been named in lists given elsewhere, and it will be unnecessary to repeat them. These are the Alstroemeria, Anemone, Anthericum, Arum, Asphodelus, Corydalis, Dielytra, Erythronium, Hemerocallis, Iris, Lily of the Valley (*Convallaria majalis*), Peonia, Ranunculus, Sanguinaria, Thlaspi, and Tritoma. It is as well to name them, to prevent any trouble, doubt, or difficulty to readers when attempting to determine them. Plants that require protection in the winter, when out of doors, or which are more suitable for indoor culture under glass, are marked with a star.

Agapanthus (*African Lily*), 30, bright clear blue.

Allium azureum, 12, dark blue.

" *moly*, 12, yellow.

" *Neapolitanum*, 18, white.

" *roseum*, 18, claret.

Amaryllis ATAMASCO *, 9, white, with rose stripes.

" *Belladonna* * (*Belladonna Lily*), 18, rosy carmine, scented.

" *crispa* *, 9, lilac. Greenhouse plant.

" *formosissima* (*Jacobean Lily*), 18, crimson.

" *longifolia* *, 36, rose, scented.

" *lutea* (*Autumn Lily*), 6, yellow.

" *vittata* *, 24, hybrid varieties of all colours.

Anomatheca cruenta *, 12, bright crimson.

Apion tuberosa, climber, brownish purple.

Begonia TRABELLI *, 9, scarlet. Greenhouse.

" *maculata* *, pink, spotted foliage.

" *Pearcei*, 12, yellow. Out doors in summer.

" *Rex* *, 18, pink, beautiful foliage. Greenhouse.

" *roseiflora* *, 12, carmine rose.

" *Veitchii* *, 6, orange scarlet. Numerous hybrids from this and *B. Rex*.

Bravoa germiniflora *, 10, scarlet.

Brodiaea coccinea, 11, dark crimson and green.

" *congesta*, 24, blue.

" *grandiflora*, 15, blue.

" *volubilis*, climber, rosy purple.

Bulbocodium vernum, 4, purple.

Caladium esculentum *, 36, fine foliage.

" *Violaceum* *, 24, reddish foliage. Other varieties are strictly hothouse plants.

Calochortus venustus *, 24, various colours.

Camassia esculenta, 18, blue, in spikes.

Canna Indica * (*Indian Shot*), 48, various colours.

Chionodoxa Lucilise (*Snow Glory*), 6, blue. white centre.

Colchicum autumnale (*Autumn Crocus*), 1, lilac rose.

Commelinia tuberosa *, 18, rich blue.

Crocus vernus (*Spring Crocus*), 6, various colours.

Cyclamen Coum, 4, purple red, white.

" *Europaeum*, 4, red, white.

" *Neapolitanum*, 6, rose, white, purple throat.

" *Persicum* *, 6, white rose.

" *giganteum* *, 8, white rose.

Daffodil. (*See Narcissus*.)

Dahlia superflua, origin whence double varieties are derived. These are divided in three classes: - Ordinary, 48 to 72; Bouquet and Liliputian, with smaller flowers, about the same height; and Dwarf, 18 to 36. Useful for bedding; various colours.

Dahlia Mexicana, origin whence single varieties are derived, 36, various colours. Early grown from seed as half-hardy annuals.

Eranthis hyemalis (*Winter Aconite*), 4, yellow.

Eucomis punctata *, 24, pale green, purple centre.

Fritillaria imperialis (*Crown Imperial*), 30, various colours.

Galanthus nivalis (*Snowdrop*), 6, white. There are many varieties of this winter-flowering bulb.

Gladiolus bizanthinus, 1, cardinalis *, 18, scarlet, white spots.

" *Colvillii*, 18, purple, with white spots.

" *alba*, 18, white.

" *communis*, 18, purple-red, rose, white.

" *floribundus*, 30, white or lilac, veined purple.

" *Gandavensis*, 24, various colours. Origin whence hybrids are chiefly derived, among which the most noteworthy i

" *Brechnycensis*, 24, intense scarlet.

" *ramosus*, 24, purple, rose, white.

" *sagittalis*, 12, dwarf var.; various colours.

Gloxinia *, 8, various; for greenhouse only.

" *Hycinthus candicans*, 60, white in tall spike.

" *orientalis*, 9, red, white, blue, purple, pink, yellow.

Ixia *, 12, many hybrid varieties; various colours.

Lachenalia *, 6, red, yellow, green, &c.

Leucojum aestivum, 15, white, with green spot.

" *vernun*, 6, white.

Lilium auratum, 60, white, gold bands, brown spots.

" *Brownii*, 36, white, brownish purple outside.

" *bulbiferum*, 24, orange, yellow, red.

" *Canadense*, 60, scarlet or yellow, purple spots.

" *candidum* (*White Lily*), 48, pure white.

" *Carniolicum*, 30, scarlet, black spots.

" *Chalcedonicum* (*Tusk's Cap*), 30, bright scarlet.

" *croceum* (*Orange Lily*), 30, bright orange.

" *excelsum*, 60, soft nankeen yellow.

" *giganteum* *, 72, white, purplish within.

" *Harrisii* (*Bermuda Lily*), 36, white.

" *Humboldtii*, 48, yellow, with brown spots.

" *Krameri*, 30, delicate pink.

" *longiflorum*, 24, pure white, scented.

" *martagon* (*Martagon Lily*), 24, rosy violet.

" *pardalinum* (*Panther Lily*), 50, scarlet, orange, and yellow, spotted.

- Lilium Philadelphicum*, 18, orange scarlet, black spots.
 " *pomponium*, 18, bright red.
 " *pyrenaicum*, 36, orange red.
 " *speciosum* (or *lancifolium*), 36, white, pink spots.
 " *album*, 36, pure white.
 " *corymbiflorum*, 54, red, white.
 " *punctatum*, 36, white, spotted rose.
 " *roseum*, 36, rose, white edges, crimson spot.
 " *rubrum*, 36, rose, white edges, purple spots.
 " *superbum*, 24 to 84, scarlet and yellow, spotted with dark purple.
 " *termitifolium* *, 15, scarlet, very delicate.
Thompsonianum *, 24, rose.
Thunbergianum, 26, red, yellow in various shades.

- Sparaxis grandiflora* *, 12, deep crimson, yellow centre.
 " *pulcherrima* *, 40, purple.
Sternbergia lutea *, 6, yellow.
Tigridia conchiflora, 12, yellow, purple spots.
 " *pavonia*, 12, scarlet, marked with yellow and purple.
Tritelleia laxa *, 12, fine blue.
 " *uniflora*, 6, white, blue, and violet.
Tritonia aurea, 18, spikes of bright orange.
 " *squalida*, 18, pink, and shades of red.
Tropaeolum aureum *, climber; azure blue.
 " *Jarrattii* (or *tricolor*), climber; scarlet, black, and yellow.
 " *speciosum*, climber; scarlet, green lip.
Polyanthus tuberosa *, (*Tulba*), 6, white, pink tinge.
Tulipa *Gigantea* — — — — — Many varieties.

Mirabilis Jalapa * (*Mirabilis of Peru*), 18, red, crimson yellow, white, plain or variegated.

Muscari botryoides (*Grape Hyacinth*), 9, blue, white.

Narcissus bulbocodium (*Hoof Petticoat*), 9, golden yellow.

" *Clusii*, 7, white.
 " *Jonquilla* (*Jonquil*), yellow, many varieties.
 " *papyraceus* (*Paper White Narcissus*), 12, pure white.
 " *poeticus* (*Poet's, or Pheasant's Eye, Narcissus*), 12, white, with crimson edge to cup.
 " *Romanus* (*Double Roman Narcissus*), 12, white.
 " *tazetta* (*Polyanthus Narcissus*), white, with yellow cups, many varieties.
 " *telmonius* (*Daffodil*), 12, yellow, many varieties.
 " *triandrus*, 12, sulphur yellow.

Nerine Sarniensis (*Guernsey Lily*), 18, rose, gold spots.

Ornithogalum Arabicum, 12, white; may be seen in flower like hyacinths.

" *pyramidalis*, 12, white.
 " *umbellatum*, 15, white, with green streaks.
dis Bowei, 12, pink or carmine, yellowish centre.
 " *Deppel*, 12, red, yellowish base
 " *rosea*, 6, pink, greenish dot at base
 " *troglodyloides*, 8, yellow, brownish-purple leaves.
 " *Valdiviana* *, 12, dark yellow.
Pancratium Caribaeum, 18, white, sweet scented.
 " *Ilyricum*, 18, white, yellow inside, scented.
 " *maritimum*, 12, white, sweet scented.
Scilla bifolia, 4, blue, purple stems.
 " *campanulata*, 12, light blue.
 " *cernua*, 6, blue.
 " *maritima* * (*Squill*), 6, blue.
 " *Peruviana* (*Cuban Lily*), 12, blue, white stems.
 " *Sibirica*, 6, brilliant blue.
 " *præcox*, 6, blue.
 " *verna*, 6, blue, white.

Vallota purpurea * (*Scarborough Lily*), scarlet.

Veltheimia Capensis *, 12, purple red.

Wachendorfia brevifolia *, 18, yellow.

Zephyranthes Atamasco *, 6, white.

BULBOCODIUM.

A very pretty early-flowering plant, best known as *Red Crocus*; blooms about a fortnight before the ordinary crocus, and, like it, may be cultivated indoors.

It thrives best in sandy loam in well-drained situations. The best-known variety is *Bulborodium vernum*, which bears a purple-red flower.

CACTUS.

genus of greenhouse perennials, many of the varieties producing magnificent flowers of the most brilliant and striking colours. They succeed best in sandy loam, mixed with brick and lime rubbish and a little peat or rotten dung. They must be well-drained, when planted, and kept dry during the winter months. When they begin to grow in spring they should be freely watered. There are many varieties—too many in fact to be mentioned here. Propagated by offsets struck in beds of light compost under slight protection.

It may be added that the various species of cacti are very suitable as permanent

window plants. The varieties of creeping cereus, one of which is known as "rat-tailed" cactus, may be grown in suspended baskets, and last for many years without requiring any change in the soil; they naturally droop and hang down, which gives them an interesting appearance. The globular cacti are curious and interesting, and are very numerous.

CALANDRINIA.

Very beautiful free-flowering plants. *Calandrinia discolor* and *C. grandiflora* have large handsome flowers, and are fine for edgings; *C. umbellata* is of a trailing habit, and produces profusely its glowing rosy-violet flowers in bunches; is invaluable for rockwork and dry hot banks, or similar situations, where it will stand for many years. They succeed best in a light rich



CALANDRINIA UMBELLATA.

soil. They may be raised from seed. The best-known varieties are—

Calandrinia discolor,—rose-lilac, hardy herbaceous perennial, 1 ft.

Calandrinia grandiflora,—rose-pink, hardy annual, 1 ft., herbaceous perennial, better suited for greenhouse.

Calandrinia umbellata,—rich rosy-violet, hardy annual, ½ ft.

CALLA. See Arum Lily.

CALCEOLARIA.

Calceolarias consist of two kinds—the herbaceous calceolaria, raised and reared under glass for exhibition purposes, and the shrubby calceolaria, grown for bedding-out. The flower of the former, through cultivation, has attained an enormous size

and a rich variety of markings, the ground colour being for the most part yellow, blotched, or spotted with brown or crimson. Herbaceous calceolarias are propagated by seed, and, as it has been said, require treatment under glass, and to be shifted as their growth requires it. The blossoms of the shrubby calceolaria are small, but very numerous, forming large trusses of flowers, and are either yellow, orange, or a rich dark velvety brown in colour, thus presenting an effective contrast when grown in clumps or masses.

Propagation, &c.—Shrubby calceolarias are propagated by cuttings. To do this take the cuttings early in October, and, having prepared a piece of ground in a north border, the soil of which must be well drained, and made light with a large admixture of sand, place the cuttings in and press the earth well round them, water them well, and cover with a hand-glass; or place the cuttings in pots, and having sunk them in a north border, under a wall, place a hand-glass or small frame over them. In this way they may be kept without further attention till the following spring, unless the weather should be very frosty, in which case it may be well to throw some covering over the hand-glass. In the spring the cuttings should be repotted, and will soon become fine plants. It is to be observed that the state of atmospheric influence most favourable to all cuttings is when a change to moist growing weather succeeds, within two or three days, the dry weather during which the cuttings have been taken.

During winter calceolarias must be protected from the frost by a covering of mats or straw. They will require very little water from November to the middle of February. About this period they will begin to grow rapidly, and may either be potted or kept as cool as possible in the

pit, and finally transferred to the flower garden in the middle of May.

CALLIOP'SIS.

The Calliopsis, or, as it is generally called, Coreopsis, is one of the most showy, free-flowering, and beautiful of hardy annuals. The tall varieties are very effective in mixed borders and fronts of shrubberies; the dwarf kinds, from their close compact habit of growth, make fine bedding-plants, and are valuable for edgings. The different varieties make very



CALLIOPSIS, OR COREOPSIS.

pretty ribbons. Amongst the tall varieties, *C. filifolia* is the most graceful and beautiful, and *C. bicolor* or *tinctoria* the most showy and effective in mixed borders. Most of these are hardy annuals propagated by seed, but some are hardy perennials and evergreens, propagated by cuttings and division of the roots. A light sandy loam is most suitable for both kinds.

CAMEL'LIA.

The Camellia is an old-established greenhouse favourite, and at one time it was supposed to be essentially a greenhouse plant. It has been found, however, that it is as hardy as the rhododendron, and as easy of culture out of doors. Its robust constitution, dark glossy foliage, and wax-like flowers, render it essentially a useful plant for greenhouse culture for amateurs; for it will bloom at a time of year when flowers, comparatively speaking, are indeed

scarce. December is the month above all others when it is most useful. By inducing early growth and early maturity, it will flower in December from habit, as well, if not better, than in any other month.

Culture, &c.— The culture and management of the Camellia throughout the year under glass may be summarised as follows:— Supposing it to finish flowering by the end of December, remove the plant to a peach-house or viney at work as soon as it can be moved from the conservatory. Shift the plant into a larger pot at once if it requires it; at all events examine the state of the roots, and act accordingly, remembering, however, that the camellia does best to be under-potted. Some prefer not potting until the growth is finished; but when the last flower drops is, perhaps, the best time. Almost any soil will grow camellias. Some grow them entirely in peat, some in strong loam, approaching to clay; and good plants may be obtained in both. The best soil, however, consists of two parts fibry peat, one fibry loam, one-sixth part sharp silver sand, and one-sixth part *rotten wood*, or clean leaf-mould. Keep them in a temperature of 55° to 60° until their growth is made and flower-buds formed. During this period they should be frequently syringed, and a humid atmosphere maintained. Towards the end of April gradually remove, by easy transitions, to a cool house or cold pit, and the last week in May to a sheltered situation out of doors, or they may continue in the same house or pit throughout the season.

CAMPAN'ULA.

A genus of exceedingly beautiful plants, annuals, and hardy biennials and perennials, characterised by the variety of their colours, profusion and duration of their bloom. Some of them are remarkable for their stately growth, others for their close, compact habit. Of the

tall-growing hardy perennials *Campanula pyramidalis* grown in pots, placed about terraces, gravel walks, or the margins of lawns, produces a most striking effect. Of the dwarf varieties, also hardy pe-

from the creeper have dropped on the soil, been buried in it, and germinated and grown the following year with all the luxuriance of the parent plant by which they were produced.



CAMPANULA PYRAMIDALIS.

rennials, *C. Carpatica* is a most valuable bedding plant, and *C. fragilis* a beautiful trailer for rock-work and baskets. Campanulas well deserve a prominent place in every garden.

CANARY CREEPER

It is the custom with many to regard the Canary Creeper, as *Tropaeolum Canariense* is familiarly called, as a plant which must of necessity be raised and spend its early days in warmth, and therefore to buy plants in pots for planting out. These seeds may be sown at the end of March, or in April, with every prospect of success, in the open air, and not of necessity in a south aspect. Indeed, this creeper, generally considered so delicate and difficult of culture without heat in its preliminary stage, has been known to grow with the utmost luxuriance in a shady northern aspect never touched by the sun except in early morning and at eve-side, and more than this, seeds

CANDYTUFT.

The candytuft, or *Iberis*, as it is also called, springs up readily from seed sown in any light rich soil. Autumn is the best time for sowing.

The improved varieties of this favourite flower now offered by florists and seeds-



CANDYTUFT (DWARF VARIETY).

men are exceedingly beautiful, and it may be questioned if any more effective annuals can be selected for a rich crimson purple colour or pure white; they succeed in any soil. For the names of varieties the reader should consult the lists of the large growers.

CANTERBURY BELLS.

This beautiful biennial—*Campanula*



CANTERBURY BELLS.

medium—is a variety of the *campanula*, which see.

CAPE BULBS.

Charming in their foliage, abundant in their flowering, and of easy culture, these plants have but one fault,—they are a very short time in flower. Conspicuous among them are the *Gladiolus*, *Ixia*, *Sparaxis*, *Tritonia*, *Watsonia*, and *Anomatheca*; all remarkable for the delicacy, brilliancy, and distinctness of their flowers.

In the open ground, a south border, sheltered by a north wall, is most suitable for their growth. It should be well drained, nothing being more prejudicial to them than a wet bottom; the soil turf-loam, a little peat or leaf-mould, and a little sand. The bulbs should be planted about six inches deep any time in October, and during the winter months the bed should be covered a few inches thick with tan or dry litter, removing it as soon as pretty fair weather sets in in the spring.

When grown in pots, the same soil will suit them; potted in October, they should be protected in a cold frame or pit. They will require little or no water till they begin to grow in spring. When they have made a little growth, they may either be planted out in a warm border, or placed on the shelves of the greenhouse near the lights, and watered regularly to keep them in a growing state till the foliage shows signs of maturity; water must then be withheld. When at rest they should be kept quite dry.

CARNATION, PICOTEE, AND PINK.

The carnation and picotee are varieties of the *Dianthus Caryophyllus*, improved and brought into their present condition by cultivation. The pink owes its origin to the *D. plumarius*. The chief distinction between the carnation and the

picotee is that the colour of the former is disposed in unequal stripes going from the centre to the outer edge; that of the picotee is disposed on the outer edges of the petals, radiating inwards, and uniformly disposed. Carnations are classified as *Selfs*, *Flakes*, and *Bizarres*. *Selfs* are carnations of one colour only, without marks, and without shading. *Flakes* are those which have the ground colour, be it what it may, striped with one colour only. In these the ground is generally white, and the stripes are scarlet, rose, or purple; and in accordance with the



CARNATION.

colour of the stripes, they are distinguished as scarlet, rose, or purple flakes. *Bizarres* are those which have the ground marked and flaked with two or three colours, and these are distinguished as crimson, pink, or purple bizarres, according to the predominance of the colour that is found in the markings. The edges of the petals of the carnation are smooth, those of the pink are generally jagged or notched. The pink, for the most part, has a dark eye, and sometimes a zone of the same colour as the eye midway between the base of the petal and the edge. Carnations, picotees, and pinks are propagated by

seeds, layers, cuttings, and pipings, the last-named mode being usually adopted for pinks.

Propagation by Seeds.—Sow seeds in May in pots, or small boxes, or seed



pans, in soil similar to that which will be described presently as a useful compost for growing carnations, and place in an airy but sheltered part of the garden. When the plants are up, and show five or six leaves, plant out in beds composed of the same rich soil, and about 10 inches apart. Protect during winter with a cold frame. Many of the seedlings will bloom in the following summer.

Propagation by Layers.—The season for propagating by layers is in July and August. The *modus operandi* is very distinctly exhibited in the accompanying illustration, and may be described as follows:—Having selected the shoots to be layered, and prepared pegs for pegging them down, and made a small trench in the soil for their reception, add a little sand where the layers are to be placed, working it into the soil. Prepare each shoot by trimming off all the leaves with a sharp knife, except 5 or 6 inches at the top; then, with a thin-bladed knife, make

an incision half through the shoot with an upward cut, beginning below a joint, and passing it through it for about an inch or so. Bend the layer down into the sandy soil prepared for it, pegging it down in that situation in such a manner as to keep the slit or tongue open, and cover it with a rich light compost. Two days afterwards, when the wound is healed, a gentle watering will be beneficial.

Propagation by Cuttings.—Cuttings are made by taking off shoots which cannot be conveniently layered, cutting them right through a joint with an oblique angular cut, and planting them in pots or beds prepared with mixed compost and sand.

Propagation by Pipings.—Piping consists in drawing out the young shoots from the joints, and inserting it into a light, sandy soil, when it takes root. As it has been said, it is a process more generally applicable to pinks than carnations. Pipings should be struck under a hand-glass, and



MODE OF LAYERING CARNATIONS.

when well rooted, should be planted in a bed, in rows 6 inches apart, and 3 inches between the plants. Supposing the pipings to be taken in June or early in July, they should remain in the bed until September, when they may be transferred to another

bed, or to pots, in a compost thoroughly incorporated, consisting of two-thirds loam from decayed turf, and one-third well-decomposed cow-dung. If in pots, let them be $4\frac{1}{2}$ inch pots, having a few crocks in the bottom, and the pots filled with compost. Lift the plants carefully, without breaking the fibres, adjusting the soil so as to place the plant in its proper position, spreading out the roots on the soil, and filling up the pot nearly to the edge. The roots must not be sunk too deep, but the soil on the top must be on a level with the collar of the plant. When gently watered, the pots may be placed in a common garden frame, and the glass closed for twenty-four hours. Throughout the winter the plants give very little trouble, seldom requiring water, but needing all the air that can be given them. In March they should be repotted in the pots in which they are to bloom. These should be $8\frac{1}{2}$ inch pots, with 1 inch at least of crocks for drainage; the soil as before.

TREE CARNATIONS.

These are so called from their peculiar habit, the shoots being long and straggling, with an upward tendency, and requiring training on sticks or a trellis of bars between two side pieces. They are also known as *Perpetual Carnations*. They are invaluable for winter blooms. The cultivation and soil are much the same as for the ordinary carnation. The cuttings, which will be furnished by the side shoots, may be struck in July or August in gentle heat, or the old plants may be laid down in a frame in the latter month. When rooted, pot in $4\frac{1}{2}$ inch pots, and winter in a cool greenhouse near the glass. The following summer the plants should receive two shifts, first into 8-inch and then into 10-inch pots. This will repress any tendency to bloom. During the summer the plants should be kept in the open air

in a cool position, and carefully trained. Towards the end of September they may be taken again into the house, and watered when necessary with liquid manure; but air must be freely given to them. Under this management they will bloom freely through the winter months.

CEANO'THUS.

An extremely handsome, free-flowering genus of highly ornamental half-hardy shrubs, suitable either for conservatory decoration, or for covering fronts of villas, walls, or trellis-work in warm situations; they succeed best in peat and loam. Some are hardy deciduous shrubs, and others evergreen shrubs, suitable only for greenhouses and hothouses. Of the hardy deciduous plants, *Ceanothus Americanus* and *C. aureus* are, perhaps, the best known.

CELO'SIA, OR COCKSCOMB.

Elegant and free-flowering half-hardy annuals, producing in the greatest profusion spikes of the most beautiful flowers. Some of the varieties have long, beautiful, slender flower-spikes, which may be dried for winter bouquets; others, again, have



CELOSIA CRISTATA, OR COCKSCOMB.

feathery or mossy plumes. Plants of the celosia flower freely if planted out in June in a warm, sheltered situation; grown in pots, they are the most graceful of greenhouse and conservatory plants, and with a little management may be had in

the whole winter. They are exceedingly valuable for dinner-table decoration. They are raised from seed sown on a hotbed or over gentle bottom heat in March; it is better to re-pot them frequently before finally transferring them to their blooming quarters in larger pots. The coxcomb of the florists is *Celosia Cristata*, remarkable for its large deep crimson blossom, which appears on the top and sides of the broad expansion into which the stem extends at the top.



CHAMÆROPS, OR FAN PALM.

CENTAU'REA.

Hardy annuals and biennials raised from seeds in any good garden soil. Biennials should be sown in March, and the annuals in April. The best known are *Centaurea cyanus*, whose beautiful blue blossom is known as the Bluebottle, Bluet, or Corn-flower, and *C. depressa*, which has a blue flower with a brownish-red centre.

CHAMÆROPS.

The Chamaerops, or Fan Palm, is a splendid plant of oriental appearance, producing a striking effect if planted out in lawns or pleasure-grounds. It is also valuable for conservatory decoration; succeeds best in rich loamy soil. It requires protection during the winter. It is propagated

by suckers from the parent plant, or by seeds.

CHELO'NE.

A beautiful hardy herbaceous plant, with showy pentstemon-like flowers, very effective in centres of beds, or groups in mixed borders; thrives in any rich soil. Propagated by division of the roots in August and September.

CHIONODOX'A.

This bulb requires similar treatment to that accorded to bulbs generally. The meaning of the name is "Glory of the Snow," by which it is better known, perhaps, to many. It does well out of doors, and may be grown in cold frames or a cool greenhouse. It thrives in a compost of peat, sand, and loam in equal proportions, if potted. It is propagated by seeds and offsets. The best known variety is *Chionodoxa Luciliae*, with blossoms of intense blue and white.

CHRISTMAS ROSE.

A variety of the hellebore, otherwise known as *Helleborus niger*. It is a hardy herbaceous perennial that cheers the



CHRISTMAS ROSE.

flowerborders and shrubberies with its pure white flowers in the depth of winter. It is propagated by division of the roots and also from seed. It thrives in any ordinary

garden soil, but prefers a shaded situation. It also blooms well under glass in a cool house, the protection thus afforded serving to preserve the purity of the flowers.

CHRYSANTHEMUM.

Although this plant is among the hardiest of the hardy, yet flowering as it does, chiefly in late autumn and early winter, its beautiful blooms are subject to injury from the weather when grown out of doors, and soon lose their freshness, and are injured in form and dimmed in colour, under the adverse influences of rain and frost. To

Reflexed, Incurved, Pompons, Anemones, and Anemone Pompons. The distinction between each class is easily recognised. The *Japanese* variety (A) is marked by its irregularity. The flower forms almost a ball, or at all events a semi ball, and its petals are tossed wildly about in every direction in charming disarray, which offers a remarkable contrast to the neatness and regularity of arrangement of petals conspicuous in the other varieties. *Reflexed* chrysanthemums are those whose petals are bent back and turn downwards towards the flower stalks. In the



TYPES OF CHRYSANTHEMUMS.—A. JAPANESE. B. INCURVED. C. POMPON.

exhibit the blooms of chrysanthemums in *Incurved* varieties (B) the arrangement of perfection it is desirable that they should at least have protection over head, if it be nothing more than an awning of water-proofed calico, with ends of the same, if the pots or border in which they are growing be at the foot of a wall to which the ends and roofing can be attached. The best protection, however, is afforded by a cold greenhouse, a glazed structure without fire heat, because such a building admits of free entrance of light, which the semi-opacity of awning will, to a certain extent, prevent.

Pompons (C) are varieties that do not attain the height of the tall large-flowering chrysanthemums, and whose blooms are smaller, say about the size of a half-crown, or not larger than a crown piece. When the term *Hybrid Pompon* is used, it is taken to denote varieties which are not small enough to be

Classification, &c.—Speaking broadly, chrysanthemums are classified as Japanese,

ranked among the true Pompons and not large enough to be placed among the large-flowering varieties. The true Pompons, it may be said, are suitable and beautiful for front shelves in conservatories, or for beds or borders out of doors. Being of compact, close growth, and having flowers about the size of very large daisies, and rivalling the large ones in colour, they are at once the neatest and most ornamental plants for furnishing the conservatory. The *Anemone* flowered varieties differ from all the others, in having a centre of close petals, almost like a sunflower, but still more like an anemone surrounded by a fringe of edging of large loose petals. The *Anemone Pompons* are merely dwarf varieties of the anemones. Further, chrysanthemums of all the varieties named above may be classified according to the time of their flowering, as *early-flowering*, blooming from July to October; *semi-early*, blooming in September and October in the open ground; and *ordinary* or *late-flowering*, blooming in November and December; but this is merely useful as denoting the time when each individual plant will flower.

Culture, &c.—It will be useful to trace briefly the culture and management of the chrysanthemum throughout the year, beginning from the flowering season. Supposing that plants are brought under shelter late in October, and allowed to flower in the conservatory, they may be removed to a cold frame or sheltered corner, out of doors, until the end of March or beginning of April. If the latter position is chosen the pots must be plunged to the rims in cinder ashes, and the tops slightly protected with some dry litter.

Propagation.—In looking the plants over at the time specified, three obvious modes of increase present themselves. The old stools may be divided, they may be planted out as they are in rich soil with a view to

layering, or cuttings may be taken off them, and the plants either planted out in the shrubbery or entirely discarded. If division is determined upon, pieces, with a single, or two or three stems, may be chosen, and either planted out into rich soil or potted. If the last-named method be decided on, they should be placed into a close frame for a week to start them, and gradually used to light and air until they are placed in a sheltered situation out of doors.

Management of Divided Plants.—When they have grown 3 inches, top them, to induce compact growth, if nice plants are your object; but if you grow blooms for exhibition only, never stop them at all. Concentrate the whole strength of the plant into two or three stems, and the strength of these stems into a single bud at the top, and that bud cannot fail to be a prodigious flower. For conservatory plants, however, two or three stoppings will be necessary, and the flowers, if not so fine, will be ten times more numerous; and the leaves will, or ought, to touch the rims of the pots.

Repotting.—As soon as the first pot is full of roots the plants should be shifted into another, or placed in their blooming pots at once; no soil is better for them than equal parts well-decomposed cow-dung, loam, and leaf-mould, liberally coloured with bone dust and sharp sand. Neither should there be much drainage, as the roots will speedily occupy the whole mass of earth, and almost prevent the possibility of stagnation. From first to last the plants should never flag, and be constantly fed with rich clear manure water.

Training, &c.—In training, the fewer stakes that are used the better, and towards the end of October the plants should be moved under glass. This is a critical change for them, and unless the

leaves are kept well syringed two or three times a day for a few weeks, the chances are they will either discolour or fall off.

Treatment in Open Ground.—Pompons, or others to bloom in beds or against walls, may receive the same general treatment in training and watering, &c. It is also a common practice with many to plant out their entire stock, and take up and pot what they require in the beginning of October. This plan succeeds well if the leaves do not wither, as the result of the check of potting.

Management of Layers.—Where layering is determined upon, the stools are planted out in rich soil, and the branches layered into pots about the beginning of July. Very nice plants with splendid foliage may be procured in this manner.

Management of Cuttings.—The favourite mode of increase by the best cultivators is by cuttings. No plant, unless it be couch grass, strikes so easily as the chrysanthemum. In any soil, at any season, put a growing branch in any place where it does not freeze nor scorch, and it is almost sure to root. Nearly all growers differ as to the best time for striking these plants. Some cultivators recommend November; some succeed admirably by inserting them in May. Perhaps it is better to make a compromise between the two extremes by striking cuttings in March. These should be well rooted and then potted off in April, and receive their first shift into pots, 4 inches or $4\frac{1}{2}$ inches across the top, the first week in May. They should then be continued in a temperature of 50° for a fortnight; headed and hardened off, and stood out of doors by the end of May, and receive their final shift a month or six weeks later. By adopting this mode the amateur will not fail to secure good blooms and presentable plants, both essential for conservatory purposes.

Varieties.—No attempt is made to give

lists of the different varieties on account of the enormous number of named plants now in cultivation. Those who desire full information on this matter should purchase the descriptive catalogue issued by Mr. N. Davis, Lilford Road Nurseries, Camberwell, London, S.E., which may be obtained for sixpence. Mr. Davis is one of the largest and most successful growers in this country, and has for years made the culture of the chrysanthemum his speciality.

CINERARIA.

Few plants are so effective for decorative purposes as cinerarias, whose form and habit is shown in the accompanying illustration. Unless for exhibition, it is best to grow them annually from seed.

Culture and Management.—The first sowing should be made in March, in pans



CINERARIA

filled with equal parts of peat and loam, and one-sixth part sand. They should be well drained, made firm, and the seed slightly covered and placed on a slight bottom heat. Keep the pans and young plants, when they appear, partially shaded from the bright sun; put them into 3-inch pots as soon as they will bear handling, return them to the same place, and renew the same treatment until they

are thoroughly established in their pots. Then gradually harden them by giving plenty of air, and place them in sheltered situation out of doors towards the end of May. As the roots reach the sides of the pots shift them into larger, giving them their final shift in September. The first flower stems should be cut out close to the bottom when large plants are desired. This will induce them to throw out from six to twelve side-shoots; these may be reduced, or all left, at the option of the grower. Towards the end of September, they should be returned to a cold pit, and they will begin to flower in October. No soil is better for growing them than equal parts rich loam, leaf-mould, and thoroughly rotted sheep or horse-dung, liberally mixed with sharp sand or charcoal dust, and used in a roughish state. They also luxuriate under the stimulating regimen of rich manure-water. Another sowing may be made in April, and a third in May, for very late plants.

Treatment of Old Plants.—The treatment of old plants may be similar to this. Cut them down as soon as they are done flowering. Shake them out and pot each sucker separately in March; then proceed as above in every respect.

Culture of Plants for Conservatory.—In August plants from seed sown in May should be dwarf and compact specimens. Select healthy plants from those potted off in July, which will now be about 3 inches high and well rooted; and shift them into 5-inch pots, in a compost of good turf-y loam and well-decomposed cow-dung, mixed with a little leaf-mould and silver sand, to keep the soil open; giving plenty of good drainage, which is essential to the health of these plants. When well-rooted in the new pots, pinch out the leading shoots. When they have made fresh growth, look carefully over them again, and pinch out all weak shoots, and such of

the old leaves as interfere with the free circulation of light and air round the stems, and place them thinly near to the glass in the front of the greenhouse, cold pit, or frame; in the latter case, raising the lights on flower-pots to secure free ventilation. When they have made considerable progress a second shift may be given, using the same compost. In February give a final shift, when a stonger compost should be used, adding to the former a little well-decomposed night-soil, or an increased quantity of cow-dung, with a smaller supply of leaf mould. Continue to thin weak shoots and superfluous leaves in order to throw the whole vigour of the growth into the leading shoots. When strong enough stake them and tie them out as wide as possible. By this means the side-shoots will soon fill up the intermediate spaces. Fumigate frequently, to prevent the green fly, which is the pest of this plant.

Application of Liquid Manure.—When the pot is pretty well filled with roots, water with liquid manure, which will preserve the leaves in a fresh green state, and give additional brilliancy to the flowers.

Plants from Seed for Spring.—Seeds sown in the beginning of August and potted off into store pots when large enough, make good plants for spring purposes. Potting into store pots prepares them for separate potting; their after-treatment being the same as above.

CISTUS, OR ROCK ROSE.

The common name of a family of hardy perennial shrubs bearing a beautiful bloom mostly white, rose, or purple in colour, with a spot of a different colour, generally purple or yellow, at the base of each petal. The flower resembles a large single rose. The variety best known, perhaps, is *Cistus ladaniferus*, or the Gum Cistus. It is propagated by layers put down after the

shrub has bloomed, or by seeds sown in April, or cuttings placed under a hand-glass in May. The cistus does well on any ordinary soil, but it prefers a shady position.

CLARK'IA.

Hardy annuals bearing cheerful-looking flowers, growing freely from seed and blooming profusely under almost all circumstances. When planted in rich soil and properly attended to, they rank amongst the most effective of annuals for the border, their large handsome flowers and shrub-like habit rendering them strik-



CLARKIA PULCHELLA.—A. PLANT. B. BLOSSOM

ingly attractive. The new varieties that have been introduced of late years, such as Purple King and Salmon Queen, varieties of *Clarkia elegant*, which yields double white blooms; the rose, white and Tom Thumb varieties of *C. integriflora*, and the pure white and pink and white varieties of *C. pulchella*, may be regarded as decided acquisitions.

CLEM'ATIS.

The generic name of some beautiful deciduous climbing plants which have been brought to the highest perfection by the cultivator's skill. The best known but most ordinary type of the clematis is *Clematis vitalba*, a hedge plant indigenous to Britain,

also called Virgin's Bower, and Traveller's Joy, on which the rarer and more delicate hybrid varieties are frequently grafted. They are otherwise propagated by cuttings taken from side-shoots and placed under a hand-light in summer, or by division of the roots. Among the best of the hybrid varieties may be named *C. Jackmanni* with large purple blossoms. *C. Jackmanni alba* with equally large white flowers. Beauty of Worcester is also remarkable for the size and excellence of its flowers.

Gardeners, amateur and professional, are requested to note that the name of this flower is pronounced clem'atis and not cle-ma'-tis as most people generally miscall it.

CLIAN'THUS.

A genus of magnificent free-flowering shrubs, which includes Parrot's Bill and Glory Pea of New Zealand, with elegant foliage and brilliantly coloured and singularly shaped flowers, which are produced in splendid clusters. *Clianthus carneus* and *C. puniceus*—Parrot's Bill—blossom freely out of doors in summer, against a trellis or south wall; *C. Dampieri*—Dampier's or Glory Pea—succeeds best planted in the border of a greenhouse, and is one of the finest plants of recent introduction; seeds sown early in spring flower the first year; succeeding best in sandy peat and loam in a hot position. They may also be raised easily by cuttings. They attain a height of about four feet, and with the exception of *C. carneus*, which bears a flesh-coloured blossom, they have brilliant scarlet flowers with a dark blotch at the base of the upper and erect petals.

CLIMBING AND TRAILING PLANTS, CULTURE OF.

In selecting climbers and trailers, it is better to plant a considerable number of any one plant that thrives well in the

locality, than to grow, merely for the sake of variety, those that do not thrive anywhere and everywhere, as experience has fully shown. Healthy growth of plants, after all, constitutes the chief charm in gardening, and, provided that this be secured, a place furnished with twenty species may be more interesting and beautiful than another that is planted with a thousand.

With reference to the culture of climbers and trailers, the Ampelopsis will grow and thrive in any soil and in any situation, and is propagated by layers and cuttings. The Aristolochia does best in sandy loam, and is propagated by division of the roots, or by layers put down in spring and autumn. The Begonia likes moderately rich soil in a warm or sheltered situation, and is propagated by cutting of its roots, or shoots, under a hand-glass in spring or autumn. Light loam, or loam mixed with a little peat, suits the hardy forms of Clematis. They are propagated by cuttings of firm side shoots placed under a handlight in summer, or by layers in September. The varieties due to cultivation and hybridisation are usually multiplied by grafting on the common Clematis (*Clematis vitalba*). The Ivies like deep rich soil, but the soil for the tenderer varieties should be fairly light. They may be propagated by layers, or by slips, inserted in a north border in the autumn in sandy soil, which should be kept moist. Good common soil is sufficient for the Jasmines, or Jessamines, which are propagated by means of layers, suckers, or cuttings placed under a handlight. The Loniceras or honeysuckles are best propagated by layers put down in autumn. They prefer good loamy soil and a shady, sheltered situation. The Passion Flower likes good but somewhat light soil. It requires a little protection by means of matting in severe winters, and may be propagated during the summer by cuttings of young wood in almost any stage, placed

in sand under a handlight. Peat and loam suit the Passion Flower, and the Tecoma also, which is propagated by pieces of the roots, or by cuttings of young shoots. The Vitis, or vine, like a rich, open loam, and is propagated by cuttings and buds of the ripe wood, and by layers. Grafting and inarching are also resorted to for the cultivated sorts. The Wistaria likes sandy loam and peat, and is propagated by layers of long ripened young shoots. Cuttings of strong roots will also serve the purpose, and young shoots getting firm, set in sandy soil and protected by a handlight.

CLIMBING AND TRAILING PLANTS, LIST OF.

Few gardens can be furnished without some climbing or trailing plants to run up trees, scramble over poles and rustic buildings, or to cover walls. The plants that are named in the following list will be found to be well adapted to any of these purposes, being perfectly hardy. To these may be added a whole host of Banksian, Boursault, Ayrshire, and other climbing roses; but there is no necessity for including them in the present list.

	Height in Feet.
<i>Ampelopsis hederacea</i> Virginian Creeper	30 to 50
.. <i>bipinnata</i>	10 " 20
.. <i>Veitchii</i>	15 " 25
<i>Aristolochia siphon</i>	15 " 30
.. <i>tomentosa</i>	15 " 20
<i>Bignonia capreolata</i>	12 " 15
<i>Clematis flammula</i>	25 "
Florida	15 "
Jackmanni	15 "
alba	15 "
.. <i>lanuginosa</i>	8 to 10
.. <i>orientalis</i>	Leather Flower 10 " 12
.. <i>viorna</i>	5 "
.. <i>coccinea</i>	5 " 6
.. <i>virginiana</i>	Virginia Clematis 25 " 50
vitalba	Traveller's Joy 15 "
<i>Hedera helix</i>	Common Joy 40 "
.. <i>Canariensis</i> ... Irish Joy	50 "
.. <i>variegata</i>	50 "
<i>Jasminum nudiflorum</i> Yellow Jessa-	15 "
<i>Jasminum officinale</i> ... Common White Jessamine	15 " 50

		Height in Feet
<i>Jasminum affine</i>		15 " 20
" <i>revolutum</i>		10 " —
<i>Lonicera flexuosa</i>	Japanese Honey-suckle	4 " 5
" <i>aurea reticulata</i>		4 " 5
" <i>periclymenum</i>	Common Honey-suckle	10 " 15
" <i>semperflorens</i>	Trumpet Honey-suckle	6 " 10
<i>Passiflora caerulea</i>	Common Passion flower	30 " —
<i>Tecomaria radicans</i>		30 " —
" <i>major</i>		30 " —
" <i>minor</i>		20 " —
<i>Vitis cordifolia</i>		20 " 30
" <i>vinifera</i>	Common Vine	20 " 30
" <i>apiifolia</i>		15 " 20
<i>Wistaria alba</i>		12 " 20
" <i>frutescens</i>		10 " —
" <i>Sinensis</i>		15 " —

Of the ivies there are many varieties, distinguished as silver ivies, golden ivies, &c., from the colour of the foliage, which are not named here. In ordering plants of the clematis, ivy, &c., it is desirable to consult the price lists of large growers.

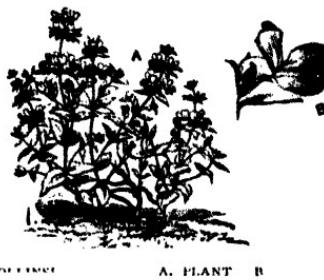
COLEUS.

The name of a genus of pretty greenhouse plants grown for the sake of the foliage, which is highly variegated and of diverse colours in strong contrast, crimson, white, dark and light green, bronze, maroon, yellow, &c., the leaves being generally of one of these colours, broadly



edged, banded, blotched, tinted or mottled with another and sometimes more of the others. The habit, form and colouring of the leaves may be gathered from the ac-

companying illustration. The plants are valuable for bedding out in the open air in the summer time, and for decorative purposes in conservatory, &c. They are



highly sensitive to cold, and if kept during the winter should be stored in a warm house whose temperature is never allowed to fall lower than from 60° to 55°. The plants can be raised from seed, but known varieties, of which there are very many, must be propagated by cuttings put in at any time from spring to autumn, and struck in a frame with good bottom heat, and plenty of moisture within. They like a light rich soil, and when rooted the young plants should be repotted and shifted frequently and pinched back to induce bush-like growth. Some few of the genus are annuals, but they are mostly perennials.

Coleus Blumei or Blum's Coleus with its numerous varieties is the best known of the genus.

COLLIN'SIA.

An exceedingly pretty, free-flowering popular genus of hardy annuals, remarkably attractive in beds, or mixed borders. Some five or six varieties are now supplied by seedsmen.

CONVOLVULUS.

A very large family of climbing and trailing plants, among which are hardy annuals and perennials propagated the

former by seeds and the latter by seeds, cuttings, or division of the roots. Any ordinary soil is suitable for the annuals and many of the perennials, but some of



CONVOLVULUS MAJOR.

the less hardy kinds require a compost of fine loam, peat, and leaf mould, especially for cuttings. The name is applied somewhat indiscriminately to climbers generally with bell-shaped or funnel-shaped flowers, thus the climber and well-known annual, *Ipomea purpurea*, is usually called Convolvulus major, and Morning Glory, and *Calystegia pubescens* with its pink double blooms, and others of like character are frequently spoken of as convolvulus. A true convolvulus, however, is found in *tricolor*, the Convolvulus minor of the garden, noticeable for its blue, white, and yellow blooms.

CORONILLA.

Handsome free-flowering half-hardy shrub, with silvery-looking foliage, and pretty yellow flowers dispersed in little tufts like coronets; easily cultivated from cuttings, growing freely in a mixture of peat and loam, and succeeding well against a south wall with a little winter protection. It is one of the prettiest shrubs that can be

found for wall decoration and for use in the conservatory.

CROCUS.

The chief self sorts of the crocus are white, yellow, blue, and purple; the striped sorts exhibit these colours in every variety of distribution. Size, consistence, shape, and distinctness of colour in the bloom, constitute the chief points in a good crocus. Nothing can be more easy than their culture. They are increased by offsets and seed, the former being the usual mode, as they increase rapidly. Offsets are treated the same as old bulbs, and will bloom the second year. Seed should be sown thinly, in well-drained pans of light sandy loam, as soon as ripe, and placed in a sheltered situation out of doors until late in the autumn. During heavy autumn rains and the cold of winter, they should receive the protection of a cold frame. If sown thin enough, they may remain in the same pans during the first summer. When their foliage dies down in the autumn, they should be shaken out of the soil, and carefully planted in beds of mellow loam in the reserve garden, placing the bulbs about 2 inches apart and 3 deep. Here



FLOWERS OF CROCUS.

they will form strong bulbs during the third summer, and a few of them may flower, the most of them, however, deferring to do so until the fourth spring. Cro-

cause are very accommodating in reference to the depth at which they are planted; from 4 to 6 inches is perhaps the best average. When they are planted in beds devoted to bedding-plants, they will reach the surface and flower, if inserted four times that depth. As the young bulbs are formed on the top of the old ones, they thus possess a self-elevating power. Crocuses will flower freely for many years without being disturbed. The best growers, however, recommend dividing and replanting every third or fifth year. To secure perfect blooms, the foliage must be left to die down of its own accord.

CUPHÉA.

Profuse-flowering plants, equally valuable for the ornamentation of the conservatory,



drawing-room, and flower-garden, propagated by seeds, and by cuttings taken in the spring and placed in rich soil and in bottom heat. *Cuphea ignea* is of a graceful branching habit, covered with splendid scarlet, black and white tubular flowers; *C. Zinampini* is covered with red-violet, and *C. ocimoides* or *aquipetala*, with rich purple-violet flowers. The perennial species, if sown early, can be used for bedding-plants the first year; the annual kinds may be treated like ordinary half-hardy annuals.

CUTTINGS.

Natural Shoots.—Cuttings in general may be considered as of two kinds—matured wood and young green shoots. The former, whatever they may be, strike readily, and, comparatively speaking, with very little care. An American plan, which is very successful, is to lay them in slightly damped moss, or to drop them lightly into a wide-mouthed bottle, having a piece of damp sponge at the bottom and a covering of muslin over the top. In either of these methods a callus is soon formed, and the cuttings readily throw out roots.

Immature Shoots.—Cuttings of young green shoots, however, require a very different treatment: they must be so managed as never to be allowed to flag, and the following appears to be the best method that can be pursued. Put silver-sand about an inch deep into shallow pans (common saucers answer every purpose), and in these plant the cuttings. Then pour carefully upon the sand enough water to make a thin sheet about it. The lower leaves of the cuttings are to be removed before planting, and the stalk fixed firmly into the sand before the water is poured on. These tender young green shoots, or cuttings, will be better for a little shade and heat. A piece of thin muslin or tissue-paper will provide the former, and heat may be had by placing the pan of cuttings over a basin of hot water, refilled twice a day. These cuttings will be rooted and ready for potting off before the water in which they are grown has dried up.

When and how to take Cuttings.—Cuttings of all sorts of geraniums for bedding the following year should be struck early: from the last week in July to the end of the first week in August is a very good time. They should be taken in dry weather, when the parent plant has had no water for some days, and they should be

kept to dry twenty-four hours after they have been prepared for potting.

Hastening Formation of Callus.—The more succulent sorts, and any that appear difficult to strike, may with advantage be touched at the end with a small paint-brush dipped in collodion, which will serve to hasten the callus which the cutting must form before it will throw out roots.

Potting.—They may be potted four or six in a pot, according to sizes. It is essential that the pots be well fitted with drainers, that the soil be light and sandy, and that it be pressed tight round the joint of the cuttings, which should be buried in it as fleet as possible. When filled, the pots may be sunk in the ground on a south border, and well watered in the evening, when the sun is off. They will require no shading, except the sun be very scorching; and, in this case, they must not be kept from the light, but merely screened from the scorching rays of the sun. They may flag a little; but this is of no importance; in two or three days they will recover, and put forth roots. If they grow too freely before it is time to take them in for the winter, the top shoots should be broken off, and in this way they will make strong bushy plants.

Protection in Winter.—To preserve cuttings from frost where there is no greenhouse, dig a pit about 4 feet deep, strew the bottom well with ashes, and sink the pots in the same. Over it place a common garden-frame, bank up the outsides with straw and a coating of earth. In such a pit, verbenas, calceolarias, fuschias, &c., &c., may be preserved during the severest winters, provided the pots be kept in the dark by being well covered with matting during frost.

CUTTINGS, BEST MEDIUM FOR STRIKING.

Silver sand is perhaps the best medium

in which to strike small cuttings. A light free soil, through which the air can pass freely, is essential to the well-being of all cuttings. That aeration is necessary is proved by the fact that cuttings will strike readily in cocoanut fibre, a material which is extremely pervious to air, and retains moisture for a considerable period. Powdered charcoal also forms a good medium. Perhaps the free access of air through the drainage is the reason why cuttings root more freely when placed close to the side of the pot.

CUTTINGS, MANAGEMENT OF.

Cuttings of hard wooded plants, such as the heath, myrtle, &c., are more difficult to strike than those of soft wooded plants, such as the geranium, &c. Free-growing hardy plants, such as the gooseberry and willow, strike freely without care or attention after inserting the cuttings in the soil. The side shoots of plants, low down in the stem, are the best for cuttings, and should be taken when the sap is in full motion, because its return by the bark tends to form the callus, or ring, of granular matter between the wood and the bark from which the roots proceed. Cuttings should be taken of wood which has ripened, or which is beginning to ripen, because in wood which is attaining or has attained maturation, the callus so necessary to root formation is more readily induced to show itself. Never cut off the leaves of a cutting except so far as may be necessary at its base in order to insert it in the soil. Formerly it was the fashion to top the cuttings, or pipings, as they are technically called, of pinks and carnations in a manner similar to that of docking a horse's tail, but this unreasonable mutilation both of leaves or tail has now gone out of date. The leaves are the lungs of plants, and if they be cut the sap that they contain will be lost to the cutting, and prevented from passing down-

wards to form the callus. Cuttings of plants that are difficult to strike may frequently be induced to do so by making a ring round them, or tying a piece of string round them for a short time before they are taken from the parent plant. The downward flow of the sap is arrested by the cutting or tightened ligature, and a swelling is caused, which forms a callus, from which roots are soon emitted. The cutting must be severed from the parent plant just below the ring or band, and the callus must be covered with soil.

Cuttings strike more readily when placed at the side of a pot, touching the pot, than when placed in its centre and surrounded with soil. Some kinds of cuttings will strike more freely when the lower end is placed in contact with gravel or crock drainage placed at the bottom of the pot. Cuttings of the mulberry and orange may thus be struck with comparative ease. It has been said that the great art in striking cuttings of the orange is to place them to touch the bottom of the pot; they are then to be plunged in a bed or hotbed, and to be kept moist. Different kinds of cuttings require different management, and no "hard and fast" rule can be laid down for all. No cutting should be set too deeply, but, as in the case of seeds, the depth will depend mainly on the size of the cutting. No leaves should be permitted to touch the soil; if they do they will damp off, or, in other words, perish by rotting and fall off. Plants with hollow stems, as the honeysuckle, should have both ends of the cutting inserted in the soil; if both ends root, the plant can be easily divided, and will then form two. Loudon tells us that too much light, air, water, heat, or cold are alike injurious to cuttings. An equable temperature should be maintained, and a moderate degree of moisture, and this is best attained by covering them with a bell glass, and shading them, if not placed in a

shady situation, which is the best possible for them. Myrtle and camellia cuttings require but little heat; those of the heath, dahlia, and pelargonium require more.

CYCLAMEN, OR SOW-BRRAH.

A genus of charming winter and spring blooming bulbous, beautiful, graceful roots, with very pretty foliage, and flowers so easily cultivated withal, that any one may enjoy the culture of these plants, either in the sitting-room window, conservatory, or greenhouse, from October to May, by a little management in the period of starting them into growth.

Culture.—Plant one bulb in a 5-inch or 6-inch pot, using a rich soil composed of loam and leaf-mould, rotted dung, and a little silver-sand, and, to secure good drainage, place at the bottom of the pot an oyster-shell or hollow potsherd, and over that some pieces of charcoal: the bulb should not be covered more than half its depth.

When the blooming season is over and the bulbs are at rest, plunge the pots in a shady well-drained border, and there let them remain till the leaves begin to grow, when they should be taken up, turned out of the pots, and as much soil removed as can be done without injury to the roots, and replaced with the compost already mentioned.

The cyclamen may be propagated by seed sown thinly in a compost of loam, peat, and sand. The seed should be sown in pans and thinly covered with earth, and then placed in a cold frame or on a greenhouse shelf near the light.

DAFFODIL, OR NARCISSUS.

The outdoor culture of these will be found in the general instructions for the treatment of bulbs in the open ground (see *Bulbs, Culture of*). For indoor or pot culture, it may be said that some

varieties of the narcissus rank only second to the hyacinth for decorative purposes, and totally eclipse it in richness of perfume. They require similar culture to the



POET'S NARCISSUS.

hyacinth (see *Hyacinth, Culture of*), and will flower in water, sand, moss, &c., but do best in soil. The Double Roman is the earliest, and may easily be had in flower at Christmas if potted in September. The varieties of the daffodil are very numerous, and seedsmen and florists frequently devote an entire price list to them. A good type of the garden narcissus will be found in the *Narcissus poeticus*, or Poet's Narcissus, with white petals and a yellow cup, edged with vivid scarlet, of whose flowers an illustration is given here.

DAHLIA.

Propagation.—Dahlias may be multiplied by seeds, by dividing the tuber—every eye, when separated with a portion of the tuber, making a plant. Others, again, cut off the young shoots under the lower leaves, and strike them in small pots filled with sandy soil. Experiments have even been made to ascertain how far grafting would succeed with the dahlia.

Seedlings: their Management.—Seedlings are procured by sowing the seeds in shallow pans and plunging them into a hotbed, or by sowing on hotbeds, prepared

for the purpose, in March. The soil should be light and sandy, with a mixture of peat-mould. The seed should be chosen from the best varieties only; it should be lightly covered with soil. A few days will bring them up, when they require all the air which can be given them safely. In April they will be ready for potting off either singly in the smallest sized, or round the edge of 6-inch pots, which strengthens them for final planting out. Towards the middle or end of August, if successfully treated, they will begin to bloom; at this time they should be examined daily, all single and demi-single bloom thrown away, unless they present some new colour or show some peculiar habit of growth, which may be improved by further cultivation and crossing. Caution in this respect is the more necessary, as it is the habit of the dahlia to improve under a second year's cultivation, some of our finest varieties having come up with indifferent flowers as seedlings. When done flowering, the young bulbs are taken up and treated as old tubers.

Cuttings: their Management.—Cuttings



DOUBLE VARIETY OF DAHLIA.

are taken as follows:—In February or March, and even as late as the first week in April, the tuber, which has been carefully wintered in a dry place, is placed in

soil placed over a hotbed, and in a very short time as many shoots as there are eyes in the tuber make their appearance. As soon as these are 2 inches long, they are taken off just below the leaves, struck singly in small pots, and again placed in the same hotbed. Others prefer cutting up the tuber as soon as the eyes are distinguishable, and replacing them either in the soil of the hotbed or in pots; but to obtain short-jointed, stout, and healthy plants, it is desirable that they should be rooted from cuttings taken off in April, and struck in a gentle hotbed, as cuttings struck in April are more healthy than those struck at an earlier period, and consequently form better flowering plants. As soon as rooted they should be potted in 5-inch pots, and again placed in a gentle heat, but with plenty of air. A week after they are potted they should receive a watering of liquid manure made from guano and powdered charcoal, well mixed with rain water, repeating this occasionally till the time of planting out. Fumigate the frame with tobacco, should there be any appearance of the green fly.

Bedding Out.—Early in May beds are repaired for their reception, if they are to be grown in massed beds. The form of the beds will depend on the general design of the garden; if a portion of the garden is devoted to them, either for the plants or the flowers, they will be best displayed in beds 3 feet wide, with alleys between. The beds being marked by stakes placed at each corner, 4 inches of the surface soil is removed, and 4 inches of thoroughly rotted manure put in its place, and the whole deeply dug and the manure thoroughly mixed with the soil in digging. In the beds thus prepared the plants are placed, the collar, as they have grown in the pots, being on the surface of the beds. The 3-foot beds will receive each a row; the stakes are firmly fixed, 4, 5, or 6 feet apart,

according to the size of the plants; the plants themselves are planted 4 inches deep, so that the crown of the plant is just above the surface. As the plant increases in growth, tying up commences; at the same time a diligent search should be made for slugs, earwigs, and other pests of the garden. These must be rooted out, or they will root out the dahlias, or at least destroy their flower.

Management in Summer.—During June and July dahlias require careful attention in watering and stirring the soil about the roots. As the lateral shoots attain sufficient length, tie them up so as to prevent their breaking, placing other stakes for the purpose, should that be necessary. The roots should be assisted by stirring the soil with a fork every two or three weeks, and by copious watering, removing all dead or straggling shoots, and keeping the plant trim and well staked. When they are intended either for exhibition or for highly-developed flowers, only one bud should be left on a shoot, and the flower should be protected both from the sun and rain by tin sconces, oilskin caps, or inverted flower pots, placed over the top of the stake to which it is tied. As the autumn approaches, the swelling shoots render it necessary to examine those tied up, slackening the strings, where necessary, to prevent them from being galled. Light coloured flowers are confirmed in their beauty by seclusion from sun and air while they are developing their bloom. Darker flowers, on the contrary, lose much of their brilliancy if too much shaded; they should, therefore, only be shaded partially from the direct rays of the meridian sun.

Soil.—Where dahlias are to fill a place in the general arrangement of the garden and shrubbery, care should be taken to supply them with suitable soil. Peat mould, mixed with sand, is useful in developing stripes and spots on the flower.

DAISY—DELPHINIUM.

Management in Autumn.—When the frost turns their foliage brown or black, take up the plants and cut off the roots, leaving 6 inches or so of stem attached; then plunge



DATURA FATUOSA.

them into a box of ashes, chaff, or sand, in order to preserve them from damp, frost, and heat, during the winter.

DAISY.

There are many varieties of this plant well worthy of cultivation. Among the most beautiful are the large double, the large quilled, and the hen-and-chickens. These, in a very rich soil, produce fine flowers, and are admirably adapted for edgings. Interesting specimens may be obtained from seed.

DAPH'NE.

Beautiful shrubs, remarkable for the elegance of their flowers and for their bright red poisonous berries. *Daphne Mezerium* is the best-known variety of the hardy deciduous section. The dwarf hardy evergreen daphnes are somewhat tender; they bear pink flowers, very fragrant. There is a Chinese daphne, *D. odora*, which is a great ornament in

the greenhouse, but too tender for the open air.

DATU'RA.

A tribe of highly ornamental plants, hardy annuals, producing large sweet-scented trumpet-shaped flowers of the most attractive character, and succeeding in any light rich soil. *Datura chlorantha flore pleno* has magnificent golden-yellow double flowers; *D. Wrightii*, or *meteloides*, has large flowers either white or bluish violet in colour. The following are some of the best-known varieties, always excepting *D. Stramonium*, or Thorn Apple, with white flowers, a plant indigenous to England, and therefore often met with growing wild—

- D. *ceratocalylon*,—satin-white, striped purple, very handsome, 2 ft.
- D. *fastuosa*,—fine violet outside and white within, from 2 ft. to 3 ft.
- D. *flore pleno* (*chlorantha* fl. pl.),—rich golden-yellow, a magnificent, free-flowering sweet-scented variety, 2 ft.
- D. *Knightii*,—white, splendid double flowers with exquisite odour, 3 ft.
- D. *querifolia*,—lilac, oak-leaved, 1 ft. to 2 ft.
- D. *Wrightii* (*meteloides*),—white or bluish violet, an exquisite, sweet-scented green-house evergreen.

DELPHIN'IUM.

A genus of profuse-flowering annuals,



DELPHINIUM AJACIS—DOUBLE VARIETY.

biennials, and perennials, of a highly decorative character. Planted in large beds or groups, their gorgeous spikes of flowers, of almost endless shades, from

pearl-white to the very richest and deepest blue, render them conspicuous objects in the flower garden and pleasure ground : they delight in deep, highly enriched soil.



DIANTHUS HEDEWIGII.

All kinds are raised from seeds, but the herbaceous perennials may be increased by cuttings and division of the roots as well. The common larkspur (*Delphinium Ajacis*) belongs to this genus, which includes *D. formosum* and many others remarkable for magnificent spikes of bloom, chiefly of darker or lighter shades of blue.

DEUT'ZIA.

A beautiful hardy shrub, covered with pretty snowdrop-like flowers when in bloom, exceedingly valuable for the spring decoration of the conservatory. They are propagated by cuttings under a hand-glass in spring or autumn. The plants should be repotted every year in a compost of rich loam, well rotted cow manure, and coarse sand. They are well adapted for forcing, but should be exempted from this process every alternate year. The best-known variety is *Deutzia gracilis*, with pure white flowers, which attains a height of from 1 to 2 feet at most, and is well suited for decoration within doors.

DIAN'THUS.

A beautiful genus, which embraces some

of the most popular flowers in cultivation. The carnation, picotee, pink, and sweet william, all universal favourites, belong to this genus. *Dianthus Sinensis* and its varieties may be considered the most beautiful and effective of our hardy annuals; the double and single varieties, with their rich and varied colours in beds or masses, are remarkably attractive ; while the recently introduced species, *D. Hedewigii*, with its large rich-coloured flowers, 3 to 4 inches in diameter, close compact habit, and profusion of bloom, is unsurpassed for effectiveness in beds or mixed borders.

DIELYTRA.

The name of a genus of hardy herbaceous plants, by which one member is so well known to gardeners generally that it is better, perhaps, to describe it here under the appellation it has gained by long usage than to place it under its true name *Dicentra*, under which few, if any, would look for it. The best known of the family is *Dielytra spectabilis*, a very handsome plant both in



habit and foliage as well as in flowers, which are of a peculiar wing-like shape, growing in long racemes. There are two varieties of this plant, one with rosy pink

blossoms, and the other with white. Although hardy, it is safer to winter it in a cold frame. It is often forced in late winter for the adornment of the conserva-



DIGITALIS OR FOXGLOVE.

tory in early spring. It likes a light rich soil, and is increased by parting the roots in spring. If forced, it must not be subjected to a higher temperature than 50 degrees. It should be freely watered when growing and on coming into bloom.

DIGITALIS.

Remarkably handsome and highly ornamental hardy perennials, of stately growth and easy culture, especially adapted for shrubbery borders, woodland walks, and pleasure grounds. They thrive in almost any soil and situation. The digitalis will be recognised at once under its more familiar name of foxglove, the white variety of which is more highly prized and better suited for gardens and shrubberies than the commoner red variety. It is raised from seed.

DOG'S-TOTH VIOLETS.

The Erythronium, or Dog's-Tooth Violet, is a pretty little bulbous plant, with beautifully spotted leaves. When planted as an

edging to beds or borders, they are remarkably effective, and do well in any light soil. To prevent decay, surround the tubers with about an inch of silver-sand. There are several varieties, but the best known and most in request is *Erythronium deus caurus*, the common dog's-tooth violet, which sends forth its lilac flowers in March.

ECHEVERIA.

A pretty rosette-shaped plant with thick fleshy leaves, propagated by offsets growing from the base of the plant, and easily detached and rooted in any good light soil. It bears red and yellow flowers, arranged like bells along a tall stem. It is useful for rockwork and ornamental planting in beds and borders.

ECCREMOCAR'PUS.

A half-hardy climber of great beauty; bearing rich orange-coloured flowers in profusion. It will grow in any common soil, and may be easily raised from seed, which it ripens in abundance. Sow in autumn on a slight hotbed, and the plants, after two or three shiftings, will be ready for turning out in April or May. If cut down in autumn, and covered with dry leaves,



ECCREMOCARPUS SCABER.

the Eccremocarpus will live through any ordinary winter, and shoot up again vigorously in the spring. The best-known variety is *Eccremocarpus scaber*, which at-

tains a height of 6 feet, and bears racemes of bright orange red flowers.

EGG-PLANT.

A very singular and ornamental class of fruit-bearing half-hardy annuals, especially adapted for conservatory or drawing-room decoration : they thrive best in very rich light soil. The best known are *Solanum ovigerum* and the Aubergine—*S. melongena* —the edible variety of the egg-plant, so extensively cultivated in the south of Europe.

Time and Manner of Sowing.—The seed should be sown in March, or early in April, in well-drained pots of light rich soil, and covered lightly. Place the pots in a cucum-



EGG-PLANT—VAR. SOLANUM OVIGERUM.

ber or melon-frame, or where a moderate heat is maintained, and keep the soil moist. When the plants are fairly up, place them singly in small pots, using rich soil, and in the same temperature near to the glass. When they have started into growth, induce a bushy habit by frequently pinching out the points.

After-management.—As soon as the plants have well filled the first pots with roots, shift them into others two sizes larger, still using rich light soil. Keep them well supplied with water at the roots. If they are intended for decorative purposes, they should be shifted into 8 or 10-inch

pots before the roots become matted. Stop the shoots at the first joint beyond the fruit as soon as this is set, and keep them in a moist, warm situation until the fruit attains a fair size, when they may be placed in a cool house. But if the plants are to be grown with the view of obtaining the largest possible crop of fruit, they should in favourable localities be planted out of doors, when the weather becomes warm, in prepared trenches, such as are recommended for ridge cucumbers. They should have the protection of hand-glasses until they are well established and the weather becomes settled and warm. If they can be planted out on a slight hotbed under the shelter of a frame, there will be more certainty of a good crop than by any other method of treatment. The plants when grown in pots are very subject to the attack of red spider, and will require frequent syringings to keep them clear of this pest. They must be liberally supplied with water at the roots, and weak manure-water after the fruit is set will be useful.

The varieties of the Aubergine are the Scarlet-fruited, White-fruited, and Black or Purple-fruited, the fruit of the last named being most used in soups, stews, &c.

ERICA, OR HEATH.

Propagation.—Heaths are propagated by cuttings formed of the tender tops of the young shoots. The cuttings should be an inch or so in length, and should be tenderly used, so as to avoid bruising any part of the stem, and inserted in pots and pans filled with pure white sand, moistened and firmly pressed down. Having inserted the cuttings, water so as to settle the sand about the roots, and having given a little time for the moisture to subside, cover them with bell-glasses, pressing the edges into the sand so as completely to exclude the air, only removing the glasses to wipe off accumulated moisture. They should then be

placed in the propagating-house, where there is one available, or in a spent hotbed. When they begin to root, which will be seen by the starting of the shoots, they should have air given daily to harden them preparatory to the removal of the bell-glasses.

Soil.—The soil best adapted for this plant is that obtained from a locality where the wild heath grows luxuriantly, taking care it is not dug too deep; the turf must not exceed 4 inches—rather less than more; as, if deeper than that, it is more than probable that the good and nutritious upper soil will become deteriorated by an admixture of inert and mischievous subsoil. The summer is the proper season to procure and store up a heap, which may safely be used after having a summer and winter's seasoning. To prepare the soil for potting or shifting, it should be cut down from a heap so as to disarrange it as little as possible, breaking the lumps well with the back of a spade, and afterwards rubbing the soil through the hands, which is far better than sifting, as it leaves more of the fibrous decomposing vegetable matter in it; add to this one-fifth good white sand, and well incorporate the two together.

Selection of Plants.—In selecting plants, it is of the utmost importance to choose healthy, dwarf-growing, robust specimens, taking care to avoid anything like meagre, leggy, stunted plants, which might live for years, but give nothing but disappointment to the cultivator.

Management, Watering, &c.—To convert plants into handsome well-grown specimens in a moderately short space of time, they must have a liberal shift. A young plant in a 60 or 64-sized pot may be shifted into a 24 or 9-inch pot, taking care that plenty of potsherds are used for drainage. Care must be taken that the soil is thoroughly mixed, by pressing with the fingers in the fresh pot all round the ball of

the plant, so as to make it quite firm and close. After being set away in a cool frame or pit, let them be well watered. This is much facilitated by placing a convex potsherd over it, and watering with a spout, leaving the water to diffuse itself equally over the whole soil, which is a means of avoiding what often occurs from watering with a rose—viz., the surface only becoming moistened while the ball remains imperviously dry.

When the plants are of free growth, and the weather is of a parching character, it will be necessary to look over them every day, and water them freely, taking care that none be allowed to suffer for want of it, which at this stage would prove destruc-



ive to the flowering of the plants, if not to their life.

ERODIUM.

The plants of this genus are partly hardy and partly half-hardy, doing well in dry, warm situations, and forming charming little plants for rockwork, edgings, and flower-borders. They are propagated by seed or division of the roots, and succeed in any soil. Perhaps the best known of the few species that have been introduced into this country is *Erodium pelargoniflorum*, with white flowers spotted with purple. It is a hardy perennial.

ERYSIMUM.

Free-flowering, and exceedingly showy

plants, producing in beds, mixed borders, and ribbons, a very fine effect. They are chiefly biennials and perennials, and are raised from seed, which may be obtained



ERYSIMUM PEROFFSKIANUM.

from any seedsman. They do best in light rich soil. One of the best known is *Erysimum Ierofskianum*, with showy but small orange flowers. It is a hardy annual about 18 inches in height.

ESCALLO'NIA.

Handsome evergreen half-hardy shrubs, with rich glaucous leaves and bunches of pretty tubular flowers. *E. floribunda*, with white flowers, and *E. macrantha*, with reddish crimson blossoms, succeed against a south wall, generally speaking, in the Midland counties, and may be utilised in forming garden hedges in the south. Any good garden soil is suitable for them, but the drainage should be good. Propagation is effected by suckers and layers, or by cuttings of half-ripened wood placed under a hand-glass in sandy loam.

ESCHSCHOLT'ZIA.

An exceedingly showy profuse-flowering class of Californian annuals, quite hardy, remarkable for extremely rich and beautiful colouring, and valuable for bedding, mass-

ing, and ribboning. The annual variety, *escholtzia tenuifolia*, otherwise *E. Californiae*, is exceedingly neat for small beds, edgings, or rock-work, and delights in light rich soil. *E. Californiae*, bearing bright yellow flowers with rich orange centre, is a perennial remarkable for the size and beauty of its blossoms. There are, however, many varieties produced by cultivation, which will be found named in the lists of the principal seedsmen.

EULALIA.

An ornamental hardy grass resembling ribbon-grass in some respects, but slighter in every respect and of not so strong a growth. They are suitable for borders and will also thrive in conservatories and cool houses, in large pots or tubs.

EUONYMUS.

A well-known garden tree, otherwise called the Spindle Tree. There are many varieties, numbering among them shrubs suitable even for fences, having glossy leaves either wholly green or variegated. The flowers are small and insignificant. Propagation is effected by cuttings taken



ESCHSCHOLTZIA CALIFORNICA.

from last year's growth in the autumn, and set in rich loam and sand.

FERNS.

Ferns suitable for Outdoor Culture.—The following will afford a list of ferns

suitable for outdoor culture, all of which may be purchased at rates ranging from 2d. to 6d. each. The ordinary name is appended in most cases, and the letters B, C, F, indicate the position in which the ferns should be placed in the fernery, namely, back, centre, or front. The names of exotic ferns, chiefly of North American origin, are placed in italics:—

- C. *Allosorus crispus* Parsley Fern.
— *Aspidium cristatum*
- F. *Asplenium adian-* Black Maidenhair
 tum nigrum Spleenwort.
- F. „ *ruta muraria* Rue Fern.
- F. „ *trichomanes* Common Maidenhair
 Spleenwort.
- F. „ *thelypteroides* ..



FIG. 1.—ATHYRIUM FILIX FEMINA, OR LADY FERN.

- F. „ *viride* Green-stemmed Spleenwort.
- C. *Athyrium filix fæ-*
 mina Lady Fern (Fig. 1).
- C. *Michauxii*
- C. *Blechnum Spicant* .. Hard Fern.
- F. *Botrychium lunaria* Moonwort.
- F. *Ceterach officina-*
 rum Scaly Spleenwort.
- F. *Cystopteris fragilis* .. Bladder Fern.
- F. „ *bubifera* ..
- B. *Lastrea semula* Hay-scented Fern.
- C. „ *atrata*
- B. „ *dilatata* Broad Buckler Fern.
- C. „ *filix mas* Male Fern.
- C. „ *intermedia* ..
- C. „ *marginalis* ..
- C. „ *montana* Mountain Buckler Fern.
- rigida* Rigid Buckler Fern.
- C. „ *Sieboldii*
- C. „ *spinulosa* Spiny Buckler Fern.
- C. „ *thelypteris* .. Marsh Fern.
- C. „ *varia*
- B. *Osmunda regalis* Royal Fern (Fig. 3).

- F. *Phegopteris hs.*
F. „ *polypodioides* ..
F. „ *dryopteris* Oak Fern.
F. „ *phegopteri* Beech Fern.



FIG. 2.—ONOCLEA SENSIBILIS.

- F. „ *Robertianum* .. Limestone Polypody.
- F. „ *vulgare* Common Polypody
 (Fig. 4).
- B. *Polystichum acrostichoides*.
- B. „ *aculeatum* Hard Prickly Shield Fern.
- B. *Polystich. angulare* .. Soft Prickly Shield Fern.
- B. „ „ *proliferum*
- B. „ *sestoum*
- B. *Pteris aquilina* Bracken.
- C. *Scolopendrium vul-*
 garum Hart's-tongue Fern
 (Fig. 5).



FIG. 3.—OSMUNDA REGALIS, OR ROYAL FERN.

Ferns, Aspect and Shelter for.
as a general rule, require shade and moisture, and they will therefore grow,

and may be cultivated with success, in many a dark and comparatively gloomy situation in which flowering plants will not thrive. For an indoor fernery, for



FIG. 4.—*PTERIS VULGARE*, OR COMMON POLYPOD.

example, a north aspect is suitable ; while for the majority of plants, whose blossom constitute their chief charm, and which are chiefly in favour during the season in which they are in bloom, it would be objectionable. In the constitution of ferns there is as much difference as in the constitution of flowering plants—that is to say, some ferns, being thoroughly hardy, will do well out of doors without the slightest protection ; others, again, require shelter, either in a cold greenhouse in which no artificial heat is introduced in the winter season, or a cool greenhouse in which artificial heat is merely utilised for the exclusion of frost ; a third class is formed of stove or hothouse ferns, which require heat, and such treatment as may assimilate the conditions under which they are grown as closely as possible to those under which they flourish in their native climes.

Ferns, Filmy.—These ferns, which are extremely beautiful in form, are not suitable for outdoor culture, but should be grown under a bell-glass or in a Wardian case in a room or greenhouse. The varieties most commonly grown are *Hymenophyllum Tunbridgense*, *H. linslateralis*,

and *Trichomanes radicans*. “They should be grown,” says Mr. Gill, “in seed-pans, well drained, with good leaf mould, a little loam, and nearly half its bulk of small broken sandstone or soft bricks. The mould should be raised, using little crooks to peg the fern on the mould firmly, leaving room round the sides for the bell-glass on the inside of the pan. Some prefer wood to grow them on, but wood decays, and the whole mass of ferns are disturbed. They require very little water over the fronds, sufficient only to clean them, keeping the glass off for a time to dry the fronds, or they will turn black. Should the fronds look dry or shrivelled at any time, plunge the seed-pan in water, letting it stand till soaked.”

Ferns, Potting.—When ferns are grown in pots or boxes, care should be taken that the drainage is perfect, and for this purpose a layer of broken potsherds, fragments of brick, and pieces of porous stone should be placed at the bottom, and on this the soil or compost, which should consist of leaf mould, sandy loam, fibrous peat, and silver sand, the first three ingredients



FIG. 5.—*POLYPODIUM VULGARE*.

being taken in equal proportions, and sufficient of the last named to make its presence apparent through the entire mass when mixed. With the compost should

be mixed small lumps of crumbling sand-stone or decaying brick, which tends to keep the soil open, and affords a substance to which the rootlets of the fern can cling. All ferns should be potted firmly, and the earth well pressed about the roots just below the crown.

Ferns, Watering.—All ferns, whether within doors or out of doors, require their foliage to be kept moist; and some, indeed, such as the Royal Fern (*Osmunda regalis*), will thrive best when exposed to the constant splash of falling water. To afford the proper amount of moisture by artificial means, the best thing that can be done is to syringe them with a syringe having the finest possible rose, from which the water will issue in the form of spray. This mode of watering the fronds should be resorted to both in the open air and in the glazed fernery. With regard to watering the roots, if the surface soil has a dry aspect, it will be necessary to give water.

FLOWER CULTURE.

Preparation of Ground.—Broadly speaking, there is not so much difference in the routine to be followed in the culture of different kinds of flowers as may be imagined by those who are unaccustomed to garden work. The preparation of the soil by mechanical means is in all cases the same; if this were not so, and if every kind of flower that grows required different treatment, it would be necessary for every amateur or grower, in a small way, to confine his attention to two or three special sorts, or to give up gardening altogether, and leave it to those who had time, leisure, money, and space to deal with it in its entirety. Happily, however, this is not the case, for generally plants are grouped into large sections or classes, and the plants that belong to each section will grow together, under the same conditions, subject only to some slight modifications that

are produced by artificial means. That is to say, when the soil has been well prepared for the reception of plants by digging, trenching, draining, when and where necessary, all that can be done is to modify it for the plants which are to be grown in it by the addition of manures, natural and artificial, sand, lime, &c., and thus bring it as nearly as possible to the conditions under which plants grow and flourish in their native habitats, or under which experience has shown that they thrive and flourish in the greatest luxuriance.

FLOWERING PLANTS: THEIR CLASSIFICATION.

If we regard the culture of flowers from this point of view, namely, that as regards the management of each great class the system to be pursued is the same for all, and that it is only in some special cases that any departure from the general routine is necessary, it is manifest that our labours will be greatly simplified, and that we shall be better able to turn them to good account when we find and feel that we have to deal with plants broadly and in masses, special treatment being reserved for a few individual sorts only. A few moments' consideration will help us to see how easy it is to arrive at the culture of plants in classes, by looking at their nature and terms of existence. First of all, flowering plants grown in gardens—no reference is now being made to shrubs, which have been dealt with in the preceding chapter—are (1) ANNUALS, (2) BIENNIALS, and (3) PERENNIALS. To one or other of these three great classes every plant must belong.

Culture influenced by Character and Class.—We must look, then, at the culture of plants, first of all, with reference to their character and as belonging to the class to which each belongs. We know that some plants are possessed of greater powers of endurance and vitality than others, and

thus it is that **ANNUALS** are regarded as being ranked in two divisions, *Hardy* and *Half-hardy*; **BIENNIALS** admitting of the same separation. Passing on to **PERENNIALS**, we know that there are two sorts, namely, those which are visible above ground, even during the hardest winter, and which do not die down to the ground in autumn and throw up fresh flower stalks in the spring, and those which die down after flowering to grow again when the time of rest is over, and Nature calls on them once more to exhibit their foliage and flowers. Perennials of the first class partake of the nature of shrubs, but those of the second are known as *Herbaceous Plants*. It is only with the culture of a few of the former that we are particularly concerned, and the latter must be dealt with *en masse* under the special title which belongs to them as a class, namely *Herbaceous Plants*, and under the heading *Bulbs* or *Bulbous Plants*, a name which is applied to them from the peculiar form, not exactly of the roots, but of that portion of the plant which never perishes as long as the plant lives, and which sends out roots below, and leaves and flowers above, in every year at the proper season.

FOLIAGE PLANTS.

These have become very fashionable of late. Many of the geraniums, such as Happy Thought, Black Douglas, and those known as zonal and tricolor geraniums, are to a certain extent examples of these, but the more noticeable specimens are to be found in the begonias, coleus, &c., and various plants used in bedding out.

FRAXINEL'LA.

Handsome, free-flowering, hardy herbaceous plants, perennials, suitable for mixed borders; succeed in any common soil.

Fraxnella,—red, 2 ft., from South Europe.
" white, 2 ft. "

FREESIA.

The name given to a species of bulbs from the Cape of Good Hope that form pretty plants for the conservatory. They can be increased without difficulty from seed, that should be sown in five-inch pots, as the freesia does not like transplanting, the seedlings being thinned out so as to leave five or six plants in each pot. The seed should be sown, when ripe, in light sandy loam on light soil mixed with sand, and be placed in a cool frame exposed to the influence of the sun's rays. The blooms exhale a delicious fragrance and are useful



CROWN IMPERIAL.

and beautiful as cut flowers. Bulbs should be potted, or re-potted as the case may be, in August or September, in light rich soil with plenty of sand. The pots should be well drained. When potted, place under a south wall and cover with ashes or coco-nut fibre until the bulbs begin to grow. Then remove the covering and transfer to a cold frame. Water sparingly, but when the plants are going out of blossom withhold water altogether, so that the foliage may be induced to wither. Stow away the bulbs in their own pots and leave them there until August when they should be repotted. The best known varieties are

Freesia Leichtlinii major, French white with orange throat, and *F. refracta alba*, pure white with yellow blotches on lower petal.

FRITILLA'RIA.

A species of perfectly hardy bulbs, among which is included the Crown Imperial. Many of them, as for example, *F. Meleagris*, or Snake's Head, have singularly marbled flowers. They are very interesting and pretty, succeeding in any common garden soil, a deep rich loam suiting them best. They do well and thrive in a deep rich loam, and as they are not averse to shade, they will grow in shaded situations.

FUCHSIA.

Whoever has a greenhouse two yards square, or a window free from dust, may grow one or more fuchsias. In fact, it has become quite a window plant, and no plant is better adapted for the purpose. Nothing can be more graceful either in form or flower than noble plants of the fuchsia. They have a grace and beauty peculiar to themselves; and their price is sufficiently low, and their culture easy and simple enough, to bring them within the reach of all. Plants that have been at rest during the winter may be started in January, and large early-flowering specimens produced by cutting down the old plants and shaking the roots out of the old soil as soon as they have broken, repotting them in a good, rich compost, with sufficient drainage. Strike cuttings for bedding plants as soon as the shoots are long enough.

Propagation.—Cuttings should be inserted in pots filled either with loam and leaf mould, or peat and silver sand, in equal parts, to within an inch and a half of the top. Place over this three-quarters of an inch of silver sand, and level the surface to make it firm; then insert the

cuttings—about 1 inch long is the proper length—and plunge the pots in a bottom heat of 60°, either in a pit or propagating house; if the latter, cover them with a bell-glass. In three weeks they may be potted into 3-inch pots, and replanted in the same bed, keeping them at a temperature of from 50° to 60°. As soon as the roots reach the sides of the pots, the plants should be shifted into fresh pots, until they receive their final shift into 6, 9, or 12-inch pots, towards the end of June. The size of the pot must be regulated by the period when they are wanted to bloom. If in July, a 6 or 9-inch pot will suffice; if in September or October, a 12-inch will not be too large.

Stopping and Training.—During the period of growth, the plants will require stopping at least six times, care being taken never to stop the shoots immediately preceding or directly after the operation of shifting into larger pots. If the pyramidal form of growth, which is the best of all forms for the fuchsia, is adopted, the plants, from the first, must be trained to a single stem, and all the side shoots stopped, to make the pyramid thick and perfect. If the bush form is wanted, the whole of the shoots should then be stopped at every third joint, until branches enough are secured to form the bush, and then be trained into the desired shape.

Temperature, &c.—A regular, moist, genial temperature must be maintained during the entire period of growth, never exceeding 60° by fire heat. During bright sunshine, the glass should be slightly shaded with tiffany or other material; the delicate leaves are easily injured, and the plant should never receive the slightest check by being allowed to flag.

Soil and Watering.—Fuchsias, while having their preferences, will grow in almost any soil. Garden loam and leaf

in equal proportions, with some broken charcoal and sand, do very well. Feeding them with manure water is preferable to mixing manure with the soil. After they are well rooted, they should never be watered with clear water. A carefully-shaded conservatory, guarded against the ingress of bees, is the best place for them when in blossom. In such a situation they will continue in bloom for three months, if the seeds are constantly picked off.

HARDY FUCHSIAS.

These make the best show when planted together in beds upon a lawn, the colours being judiciously blended. Those fuchsias which trail upon the ground should be grown with a wire hoop, supported by three legs underneath them, so that their branches may be made to bend over the hoop. Several of the more hardy sorts may be trained on one stem, so as to appear as standards in the bed. Many varieties of the fuchsia are hardy, and will stand our winters in the open ground, especially in a well-drained light soil, having a large portion of peat in it; and a great many that are looked upon as tender varieties will be preserved if covered 3 or 4 inches with dry cinder ashes at the first approach of frost. The best plan is to cover the whole fuchsia bed at that time with a good coating. The dead branches should not be cut off, nor should the ashes be removed until the fuchsias begin to shoot in the spring.

FUNKIA.

A genus of fine, hardy, herbaceous plants, suitable some for the shrubbery and others for the border and rockwork. They are remarkable for their broad leaves and spikes of ball-shaped flowers, mostly white, with a tinge of lilac. They require soil that has been well dug and enriched

with manure. They are propagated by division of the crowns and roots at any time from December to March. The best known are *Funkia grandiflora* or *Japonica* and *F. Sieboldiana*.

GAILLARDIA.

These hardy plants, with large daisy-like flowers, natives of the temperate zones of North and South America, are annuals and herbaceous perennials. The former are splendid bedding plants, remarkable for the profusion, size, and brilliancy of their blossoms, continuing in beauty during the summer and autumn. They thrive in any light, rich soil, and may be propagated



GAILLARDIA.

by cuttings or by seeds sown, in the case of the perennials, in February or March in gentle heat. The annuals are both propagated by cuttings, but seeds may be sown in the usual way when other annuals are sown. There are many hybrids from the original varieties, which may be obtained from any seedsman.

A genus of beautiful evergreen shrubs, suitable for the hothouse or greenhouse, remarkable for their beautiful white sweet scented flowers which are now much utilised as cut flowers. These plants require much heat and plenty of water when growing and coming into flower. Propagation is

effected by cuttings, or rather shoots should be allowed to remain where they stripped from the plant with a heel, set in sandy peat well drained, and placed in a propagating frame with a bottom heat between 70° and 80°. The best known are *Gardenia florida*, also called Cape Jasmine, and *G. radicans*.

GENIS'TA.

The genistas are exceedingly ornamental profuse-flowering hardy shrubs, equally valuable for the decoration of the conservatory, flower-borders, and shrubbery; having for the most part yellow pea-shaped flowers, which come in clusters at the end of the branches. *G. tinctoria*, the dyer's broom, yields a good yellow dye.



GENTIANELLA.

GENTIA'NA.

All the gentians are beautiful. *Gentiana acaulis*, with its large deep mazarine-blue blossoms, looks well as an edging plant. It requires a pure air and rich light soil. They are propagated by seeds sown when ripe, and by division of the roots. The seeds should be sown in fine loam mixed with sand, and should not be too deeply covered. If sprinkled on the surface of the compost, and a little mould strewn over the seeds when sown, it will be sufficient. The seeds are very long in germinating. They require no bottom heat or protection beyond the exclusion of frost. The gentians are impatient of root division and indeed of transplanting, and when once established in any position the plants

are less liable to suffer from division of the roots than other varieties, but even with this it is best to plant out seedlings.

GERA'NIUM.

These well-known floral favourites are not less indispensable for outdoor than for indoor decoration. No plants are universally cultivated, and of none are there greater varieties.

With regard to classification, although the term "geranium" can be taken to cover both sections of plants to which the names *geranium* and *pelargonium* are usually applied, yet the former is more generally assigned to the hardier sorts, mostly self-coloured, being white, salmon, scarlet, cerise, &c., and single and double, while the latter gathers under it all the show varieties of which the two upper petals are generally distinct in colour and markings from the three below. Many of the varieties of the geraniums are distinguished by the beauty of their foliage, for which, indeed, they are chiefly prized. The fine-foliaged geraniums comprise Golden Tricolors, Silver Tricolors, Tricolor variegated, varieties with ornamental foliage, such as "Happy Thought" and "Freak of Nature," heavily blotched with white, Golden Bronze, Yellow-Leaved and White-Edged varieties, Zonal, Ivy-Leaved, and Mottled varieties, with a long train of double varieties distinguished by their colour, which each comprise so many distinct sorts that they can only be described and named in the catalogues of nurserymen who grow them on a large and extended scale. The pelargoniums are well-nigh as numerous in their groups, including French Spotted and Early Flowering varieties, Fancy Pelargoniums for exhibition, both large flowering and small flowering, and

the magnificent Hybrid Double Regals of recent introduction.

GERANIUMS : BEDDING VARIETIES.

Striking Cuttings.—It is desirable, and indeed necessary, that cuttings of all sorts of geraniums for bedding the following year should be struck early : from the last week in July to the end of the first week in August is very good time. They should be taken in dry weather, when the parent plant has had no water for some days, and they should be kept to dry twenty-four hours after they have been prepared for potting. The more succulent sorts, and any that appear difficult to strike, may with advantage be touched at the end with a small paint brush dipped in collodion, which will serve to hasten the callus which the cutting must form before it will throw out roots. They may be potted four or six in a pot, according to size. It is essential that the pots be well fitted with drainers, that the soil be light and sandy, and that it be pressed tight round the joint of the cuttings, which should be buried in it as flat as possible. When potted, they may be sunk in the ground on a south border, and well watered in the evening, when the sun is off. They will require no shading, except the sun be very scorching ; and, in this case, they must not be kept from the light, but merely screened from the scorching rays of the sun. They may flag a little, but this is of no importance ; in two or three days they will recover, and put forth roots. If they grow too freely before it is time to take them in for the winter, the top shoots should be broken off, and in this way they will make strong bushy plants.

Preservation of Old Plants through the Winter.—Take them out of the borders in autumn, before they have received any injury from frost, and let this be done on a dry day. Shake off all the earth from their roots, and suspend them, with their heads

downwards, in a cellar or dark room, where they will be free from frost. The leaves and shoots will become yellow and sickly ; but when potted about the end of May, and exposed to a gentle heat, they will recover and vegetate luxuriously. The old plants, stripped of their leaves, may also be packed closely in sand ; and in this way, if kept free from frost, they will shoot out from the roots, and may be repotted in the spring.

GERANIUMS : SHOW PELARGONIUMS—THEIR MANAGEMENT.

To secure profusion of bloom, early growth and under-potting are of the first importance. No matter how robustly a plant is grown, one eighteen months old cannot be made to flower so freely as one four or five years old. Whether the closeness of tissue, induced by age, modifies the nature of the sap during its passage or not, it is not possible to determine. It is probable that the smallness of the vessels may influence, not only the quantity, but the quality of the sap. It is at least certain that age in this and many other species is favourable to profuse inflorescence.

Early Growth.—This is of the most importance. Plants to flower in May should be cut down by the end of the previous June ; have broken, been reduced, repotted, and encouraged to grow 2 or 3 inches in a close cold frame, for a fortnight, and have received their final stopping by the end of July, and be placed in their blooming pot by the 1st of November. Success depends upon their chief growth being completed before Christmas. No after management can compensate for the neglect of early growth. Any size of plant or leaf may be obtained at any period ; but the flower will be scarce unless early growth is secured.

Under-Potting.—This is the next great point. Plants in general, and pelargoniums in particular, flower best when they

are pot-bound—that is, when the roots are trying with all their strength to burst the pot asunder.

The energy they thus acquire appears to rush to the other extremity, and expend itself in flowers. Some varieties will scarcely flower at all unless their roots are in this condition. The reason seems to be, that whatever tends to check the extension of other parts, favours the development of flowers. The vital energies arrested in the formation of wood, concentrate their force in the exhibition of bloom. It would appear as if the vital force in plants was not sufficiently powerful to carry on both these functions simultaneously. At all events, when one is most active, the other is almost passive, and the power of the one is nearly always in the inverse ratio of the other: hence, whatever favours the production of wood (free, large potting, for instance) is unfavourable to the production of flower, and *vice versa*.

GESNERAS.

Showy hothouse tuberous-rooted and herbaceous plants mostly with scarlet flowers. They are propagated by increase of the tubers or by cuttings, which require a little bottom-heat, and should be placed in peat. The tubers should be set in a compost of peat, loam, and sand, in 5-in. pots, which should be well provided with drainage. There are many varieties. Great care is required in their culture, and the plants often suffer injury from

GLADIOLUS.

The hybrid varieties of the gladiolus are very numerous and very beautiful, and their treatment may be summarised as follows:—The grand display of flowers is made by these plants in June and July, and if seed is no object the flower stems should be cut down, or rather shortened, by removing the

withered flower spike, when many of the bulbs will throw a second flower-stem. The stems could only be cut down as far as the first leaf, as the leaves continue fresh and beautiful, and the second flower stem often proceeds as a lateral from this point. They are easily increased by seed; but, as they are already so numerous, it is as well, perhaps, to leave this mode to the growers. The only drawback is that, in the most favourable circumstances, gladioli will not remain in bloom for longer than two months.

Propagation and Culture.—When taken up in November, they should be put away,



GLADIOLUS GANDAVENSIS.

with their old fibres and some soil adhering to them, in a dry room, the temperature not being allowed to sink under 40°. Prepare for planting in the following March, by carefully rubbing off the old roots and soil adhering at the bottom of the bulb, and carefully save all this *débris*; you will then perceive that each bulb asks you to divide it into two—sometimes three or four; that is, they will almost split themselves, and will have so many embryo shoots. After dividing and planting your bulbs, examine the *débris*, and you will find hundreds of thousands of little scaly-looking rubbish, which, indeed, are not

rubbish, but young gladioli. Pick out the old roots and large particles of soil, draw a drill two inches deep on a bit of rich soil in the reserve garden, sow the scales thinly, and there will be such a crop of bulbs as will astonish every reader. Some of these will flower late in the autumn, many of them the second, and all the third year. These young bulblets require exactly the same treatment as the old ones. They also begin forming offsets at once, and after the second year they divide the bulbs in the same manner.

Soil and General Management.—Gladioli are divided into two sections, namely, the *early-flowering* and the *late-flowering* varieties. The early-flowering varieties, of which *Gladiolus Colvillei* and "The Bride" may be taken as examples, bloom from the beginning of June to the end of July, but may be induced to flower earlier under glass. These should be planted in October, or, at the latest, in November. The late-flowering varieties, of which *G. Gaudensia* and *G. Brechtlyensis* are fitting representatives, bloom in August and September, and should be planted in March. The bulbs, or corms, should be lifted in October or November, and dried off. Gladioli, in common with bulbs in general, like a light rich soil, and if the ground in which they are to be planted is poor, or in any degree heavy, a plentiful dressing of well-rotted manure and some sand should be incorporated with it, and the bed allowed to lie three or four weeks before the bulbs are planted. A warm spot, well exposed to the sun and sheltered from cutting winds, should be selected, and when winter approaches and frost sets in it is desirable to protect beds in which early varieties have been planted by a covering or mulching of litter about 4 inches deep.

GLOXIN'IA.

A superb genus of hothouse plants, pro-

ducing, in great profusion, flowers of the richest and most beautiful colours. They thrive the best in sandy peat and loam. There are already many hybrid varieties with flowers ranging from the purest white to the deepest crimson, most of them being marked and dappled with spots and blotches, generally of a deeper colour on the inside of the blossom. Propagation is effected by seeds sown at the end of January or the beginning of February in a compost of peat, sand, and fine rich soil, thinly covered and exposed to a bottom heat of about 70°. Old tubers, when started in heat, supply shoots from which cuttings may be made: these should be placed in a



GLOXINIA.

close propagating frame and subjected to moist and gentle heat. Another means of propagation is by means of leaf cuttings taken from the plant with the bud on the end of the leaf stalk attached. These should be inserted in the same kind of soil as that prescribed for seeds.

GODE'TIA.

This is a name given of late years to the purple-flowered kinds of *Oenothera*, or Evening Primrose.

GUERNSEY LILY.

The flower of the Guernsey Lily, or *Nerine sarniensis*, is of a pale salmon colour, and by no means so brilliant in

colour as many varieties of the species to which it belongs. It must not, however, be confounded with the Belladonna Lily, another amaryllid which it greatly resembles in form, habit, and manner of growth.



GUERNSEY LILY.

The bulls of these lilies arrive from Guernsey early in August, with the flower-bud ready to expand, so that by the end of the month they are in full bloom. Orders should therefore be given early for them, as they are too advanced to travel safely when ordered late in September.

Culture.—Plant in moss, cocoa-fibre, water, in any ornamental vase, &c., and they will bloom as well as if planted in the richest compost.

An ornamental foliage plant, with leaves of an immense size, particularly valuable for margins of lakes, islands, shrubberies, and pleasure grounds; succeeds best in a rich loamy soil, and requires a slight winter protection. All plants of this species are hardy herbaceous perennials. The best known is *Gunnera scabra*, with a large spike of small flowers of a reddish colour.

LILARIA LILUM. See *Helianthus*.

HEARTSEASE, OR PANSY.

Pansies are of two kinds—the *English*, or Show variety, and the *Belgian*, or Fancy variety. If it be asked what constitutes the difference between a Show and a Fancy Pansy, the answer is that it is in the "blotch," or patch of colour immediately in the vicinity of, and proceeding from, the eye, as it were, this being small in the former and large in the latter—the larger, indeed, the better. The Show pansy is divided into three classes, namely, white grounds, yellow grounds, and selfs. In a white ground pansy, the three lower petals are white or cream, the outer edge surrounded by a belt of darker colour, either broad or narrow, according to the variety. A yellow ground differs from the white ground in the colour only, which is yellow instead of white. The top petals in both varieties are selfs—that is, of one colour throughout—and should be of exactly the same shade as the belt. A self is a pansy of one colour only, the blotch and eye excepted. In very dark selfs no blotch is discernible. The different parts of the pansy, namely the eye, the blotch, the



GUNNERA SCABRA.

ground colour, and the belt, may be discerned from the accompanying illustration, in which they are clearly indicated, and which represents a Show pansy. Pansies may be propagated from seed, or by cuttings,

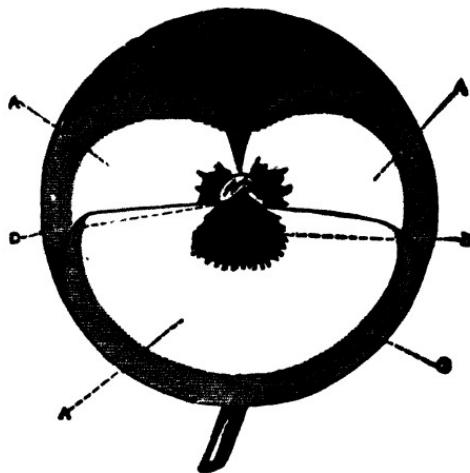
or division of the roots; they are suitable also for pot culture.

Soil: its Preparation, &c.—Any ordinary garden soil will do for the pansy; but to grow them for exhibition purposes it must be properly prepared as follows:—Trench the ground two spits deep in October or November, bringing the best soil to the top. If the plants are to be grown in a bed it should not be more than 4 feet in width. When dug over, the ground will be about 3 or 4 inches above the surrounding ground,

to become pasty if the weather be wet. It is better not to put the compost on the bed until spring, or a short time before the plants are set out.

Propagation by Seeds.—Seed that is intended for sowing should be gathered from the best flowers only—that is to say, flowers which are conspicuous for form, substance of petals, size, and good decided colours. It should be gathered just before it is ripe, otherwise the pods burst and the seed is lost, for in hot weather the pods burst suddenly, and the seed is scattered in all directions. When gathered, it should be put into envelopes, sealed down, and put in the sun to ripen fully. When ripe, sow at once if wanted for spring blooming, but for summer and autumn flowering sow in April. Seed intended for a spring display of flowers should be sown in boxes, using good light soil; the same as that recommended above for plants will do very well. If the soil is damp at the time of sowing, and the boxes are kept in a shady place, no watering will be required until the seedlings make their appearance above ground; if the soil be dry, water through a fine rose at the time of sowing.

As frosty weather approaches



a. Ground Colour. b. Blotch. c. Belt. d. Eye.

and about 6 inches of the top soil should be removed, and replaced by a compost of three parts of good rotten turf, two parts of leaf mould, and one part of good rough sand, white or grey—red sand should never be used, as it contains iron, which is, in some cases, injurious to vegetable life. The compost should be turned over at least half-a-dozen times, and well mixed before it is used. Large lumps should be broken, but the soil should not be made too fine, as when in this condition it is apt

the boxes should be placed in a cold frame. In the beginning of April transplant into beds.

Propagation by Cuttings, &c.—Pansies require little attention during the autumn months. Indeed, those not intended for propagation may be dug up as soon as flowering is over. The choicer varieties must be taken care of in order that their roots may be divided or cuttings taken from them in April or May, for it is only by such annual renewal that degeneration can be

prevented. Propagation by cuttings may take place any time from April to the end of October, although August and September are the best months for the work. The young shoots that spring from the base of the plant make the best cuttings: those that have flowered have generally hollow stems; these do not root so freely, and should not be used unless the variety is extra good or scarce. Cuttings should be taken off just below a joint, with a sharp knife.

Soil for Cuttings.—The soil intended for cuttings should be fine, and a good supply of rough sand thoroughly mixed with it. Sand is absolutely necessary, as few will strike root without it. The propagator will do well to place some sandy soil round the base of the plants, and also to cover with it all naked stems that are pegged down: the young shoots will root into it, and save the time and trouble of striking after they are separated from the plants. No cuttings of unhealthy plants should be put in, as these seldom do any good. The hardier kinds can be wintered successfully in the open, at the back of a north wall, or any shady nook in the garden, remembering never to put any under trees, as the drips will surely rot them. The best kinds should be wintered in cold frames, each variety being labelled as it is set.

Culture in Pots.—Plants intended to be grown in pots should be struck from cuttings in July or August. When rooted, plant in 4-inch pots with a few crocks at the bottom, using the same kind of soil as for plants in the beds, then place in a cold frame, plunging the pots up to the rims in ashes or cocoa-nut fibre; plenty of air should be given, not forgetting to water when required. Keep in the frame until the end of March or the beginning of April, giving plenty of air on warm days. Then shift into 8 inch pots, and plunge in ashes or

fibre as before. Keep close for a few days, and then admit air gradually. All plants should have short sticks placed to them, and the shoots tied carefully to the sticks. Plants in pots often furnish splendid blooms for exhibition.

HELIANTHUS.

A genus of hardy annual and perennial popularly known as Sunflowers, remarkable for their stately growth and the brilliancy and size of their noble flowers; they are eminently adapted for dispersing in shrub-



SUNFLOWER (*HELIANTHUS ANNUUS*).

berry borders. Round the margins of lakes, ponds, and wherever plants of this character are required, this genus will be found extremely effective. The common sunflower (*Helianthus annuus*) is an annual, but of this there are many varieties, possessed of great floral beauty. Pre-eminent among these are *H. a. globosus fistulosus* and *H. a. Californicus plenissimus*. These are particularly adapted for mixed flower-borders and large beds in conspicuous situations. They grow freely in any rich soil.

Among the perennial varieties that known as *Harpalium rigidum*, which is about 2½ inches in height and has a beauti-

ful flower with a black disc richly studded with yellow stamens and surrounded with petals of a brilliant yellow, is strongly recommended. The harpalium is now



HARPALIUM RIGIDUM (*see HELIANTHUS*).

included among the sunflowers: hence its mention here.

HELICHRYSUM.

These beautiful plants, mostly half-hardy or hardy herbaceous perennials and hardy annuals are commonly known as "everlastings"; they are exceedingly effective in mixed flower-borders. The flowers, if cut when young, make pretty winter bouquets. There are many varieties, but *Helichrysum bracteatum* and those akin to it, namely, *H. b. aureum*, *H. b. bicolor*, *H. b. compositum*, *H. b. macranthum*, and *H. b. nibeum*, are all equally beautiful, and suitable alike for borders or as pot plants for indoor decoration. These annuals are raised from seed sown in gentle heat in March and transplanted to the open borders early in April. The perennials are propagated by cuttings planted in April, also in gentle heat. These should be kept close.

HELIOTROPIUM.

The heliotropiums or heliotropes are

profuse-flowering and deliciously fragrant plants, valuable for bedding, ribboning, rustic baskets, and pot-culture. Seeds sown in spring make fine plants for summer and autumn decoration; they succeed in light rich soil. The best plants are obtained from cuttings in the same way as verbenas and bedding calceolarias. All the heliotropes are very sensitive of frost. "Cherry Pie" is a popular name for the heliotrope, from the supposed resemblance of its odour to that of the pie named.

HERBACEOUS PERENNIALS.

Herbaceous plants are very beautiful, and a good collection of them makes a very fine display in any garden. At all events, it may be said that this class of plants, with hardy bulbs, is best suited for gardeners who are possessed of but little experience, and who, for lack of time or other reasons, cannot pay so much attention to horticulture as they might otherwise wish.

Soil.—Any ordinary garden soil is suitable for herbaceous perennials; but soil that is light and easily worked, and is moderately rich in humus, is more suitable



HELICHRYSUM BRACTEATUM (*see HELICHRYSUM*).

for these plants, taken generally, than heavy, lumpy soil, although many will grow even in this.

Culture.—Some plants of this class are

propagated by division of the roots,

in February or March, just as they are showing indications of making fresh growth. Others may be propagated by means of layers or cuttings, or raised from seed. Herbaceous plants are improved, and will be more healthy and sightly, and flower better, if they are taken up every three or four years, divided or reduced in size if needful, and then separated after digging the ground somewhat deeply, turning it over and breaking it up thoroughly. Plant firmly, pressing the earth well round the collar of each plant. The borders in which



HELIOTROPE (see HELIOTROPIUM).

herbaceous plants are set should be kept clean and free from weeds. The plants themselves should be watered occasionally, if the situation and summer draughts are such as to render it necessary: those requiring support from sticks should be carefully staked, and when the flower stalks and flowers begin to wither, they should be removed.

This comprehends nearly everything that is necessary in the treatment of herbaceous plants, but to this may be appended the following instructions. To insure good flowers, a few strong stems of such plants as phloxes, asters, &c., must be secured, in preference to a multiplicity of smaller

ones. Consequently, they require frequent and severe subdividing; the early months of the year, up to April, being the best period for performing this operation. Others, again, such as gentians, iberis, alyssums, achilleas, and similar flowering plants, thrive best without being often disturbed, and must be increased by small-rooted offsets. These should be planted in the reserve garden for the summer, and transferred to their flowering quarters next year. Double Rockets, Scarlet Lychnis, Hollyhocks, and other double-flowering plants, are often increased by cuttings. These can generally be obtained either by thinning the young shoots in the spring, or by securing all that appear at the bottom of the flowering-stems in the autumn. Whenever taken, they should be inserted in sandy soil, covered with a hand- or bell-glass, and receive a gentle warmth until rooted. If in the spring, they will of course be transferred to the reserve garden as soon as the rooting and gradual hardening processes are completed. If in the autumn, they will be safer under shelter until the end of April. In either case, with liberal treatment, they may flower the following summer. To induce autumn-struck cuttings to do this, however, they must be potted off in rich soil as soon as rooted, shifted into separate pots, and receive the stimulus of a genial atmosphere and shelter from the weather. All the mints, galiums, and other plants with running or creeping roots, are so easily and obviously increased as to require no instructions.

All single-flowering herbaceous plants may be increased readily by seed. This may either be sown as soon as ripe, or after September in pots. If sown in early spring on beds of light soil, and the plants carefully transplanted two or three times during the summer, they may be transferred to their blooming quarters in

November: if they have been properly treated, they will flower profusely the following season.

HERBACEOUS PERENNIALS, LIST OF.

The following is a list of herbaceous perennials, showing, when possible, the familiar garden name, and the height in inches and colour of the flowers:—

- Acanthus mollis*, 48, lilac.
" *latifolius*, 48, lilac.
- Adenophora liliiflora*, 12, blue.
- Adonis vernalis*, 9, yellow.
- Astræmeria aurea*, golden orange. Other varieties of different colours. Plant deep in light soil.
- Alyssum saxatile*, 6, yellow.
- Anemone Appenina*, 6, blue, early bloomer.
" *coronaria* (*Garden Anemone*), 9, various
" *fulgens*, 12, brilliant scarlet. Likes calcareous soil.
" *hortensis*, 9, various.
- Japonica*, 24, pure white, red, rose.
" *narcissiflora*, 12, yellow, white.
" *pavonia*, 12, crimson, scarlet.
" *Pennsylvanica*, 12, white.
- Antericum liliastrum*, 12, white.
- Antirrhinum majus* (*Snapdragon*), 24, various.
- Aquilegia caerulea*, 18, pale blue and white.
" *chrysanthia*, 24, yellow.
" *glandulosa*, 18, blue and white.
" *Skinneri*, 18, dark scarlet and yellow.
" *vulgaris* (*Columbine*), 24, various.
- Arabis alpina*, 6, white.
- Asclepias tuberosa*, 24, orange, scarlet. Likes peat.
- Asphodelus luteus*, 36, yellow.
- Aster amelloides* (*Michaelmas Daisy*), 24, purple.
" *alpinus*, 12, lilac blue.
- Aubrieta deltoidea*, 4, purple.
" *Grecia*, 4, rosy lilac.
- Baptisia Australis*, 30, blue, shy bloomer.
- Bellis perennis* (*Daisy*), 6, red, white, variegated.
- Bocconia Japonica*, 60, cream colour.
- Calystegia pubescens* (*Double Convolvulus*), 60, climber, rose.
- Campanula Carpatica*, 6, blue, white.
" *latifolia*, 50, deep slate blue.
" *nobilis*, 18, purple, white.
" *pumila*, 6, greyish blue, white.
" *pyramidalis*, 45, pale blue, white.
" *turbinata*, 6, pale blue.
- Catanauche carulea*, 36, blue.
- Cantaura montana*, 18, blue.
- Ceratium tomentosum*, 6, white. Valuable for foliage.
- Cheiranthus Cheiri* (*Wallflower*), 24, various.
- Cistus helianthemum*, 9, various colours.
- Clematis integrifolia*, 36, blue.
- Clematis montana*, 60, climber, white in clusters.
" *recta*, 24, white.
- Convallaria majalis*, (*Lily of the Valley*), 9, white.
- Convolvulus Mauritanicus*, trailer, light blue.
- Corydalis bulbosa*, 9, purple, rose.
" *nebulosa*, 12, pale yellow.
- Cucumis perennis*, large climber, suitable for arbours.
- Delphinium cardinalis*, 24, bright scarlet.
" *Cashmerianum*, 15, blue and mauve.
" *formosum*, 40, brilliant intense blue.
" *hybridum flore pleno*, 24, various colours.
" *nudicaule*, 18, scarlet. Useful for pot culture.
- Dianthus caryophyllus* (*Carnation*, &c.), 18, various
" *dentosus*, 9, various colours.
" *plumarius* (*Pink*), 9, various.
" *superbus*, 18, bright lilac.
- Dictamnus fraxinella*, 30, red, in strong spikes.
- Dilectra spectabilis*, 21, pink, white.
- Dodecatheon Meadia*, 12, pale spotted with yellow, white. Like shade and peaty soil.
- Epimedium macranthum*, 8, white.
" *pinnatum*, 10, yellow.
" *purpureum*, 8, purple and yellow.
- Eremurus spectabilis*, 24, yellow.
- Erigeron speciosum*, 24, lilac blue, yellow centre.
- Erinus alpinus*, 6, brilliant violet red.
- Eritrichium nanum*, 1, sky blue. Suitable for rockwork.
- Eryngium Alpinum*, 24, blue.
- Erythronium dens canis* (*Dog's tooth Violet*), 6, rosy purple, deep lilac, white, rose.
- " " " *Americanum*, 6, white,
" *grandiflorum*, 6, yellow.
- Ferula communis* (*Common Fennel*), 70, yellow. Remarkable for beauty of foliage, and useful for culinary purposes.
- Funkia alba*, 24, white. Handsome foliage.
" *Japonica*, 18, greyish white.
" *lancifolia*, 24, bluish white.
- Funkia ovata*, 18, blue, dark glossy green leaves.
- Gaultheria procumbens*, 6, white, with cherry-like berries.
- Gaura Lindheimeria*, 24, rosy white.
- Gentiana acaulis*, 4, intense blue.
" *lutea*, 48, yellow.
" *verna*, 4, rich brilliant blue.
- Geranium Lancastriense*, 3, rose, with darker stripes.
" *tuberosum*, 15, mauve.
- Geum coccineum*, 18, bright scarlet.
- Gypsophila paniculata*, 30, white, beautiful foliage.
- Harpalium rigidum*, 36, yellow, black centre.
- Helleborus niger* (*Christmas Rose*), 12, white and various.
- Hemerocallis flava* (*Day Lily*), 24, soft yellow.
- Hepaticas triloba*, 6, blue, red, white.
- Hesperis matronalis*, 24, purple, white.
- Hieracium aurantiacum*, 18, orange.
- Hoteia Japonica* (*Spiraea*), 24, white, pink.
- Iberis sempervirens* (*Candytuft*), 9, white.
- Iris foetidissima* (*Stinking Gladwyn*), 30, blue-lilac. Remarkable for seed pods. Lik moist situation.
- " *Germanica* (*Blue Flag*), 24, blue and various colours.
" *graminea*, 11, dark violet blue.
" *Kempferi* (*Japanese Iris*), 18, various colours.
" *pumila*, 10, various colours.
" *Sibirica*, 24, white, with blue veins.
" *Susiana*, 24, greyish white-veined with purple.

- grandifolius*, 45, rosy red.
latifolias, (*Everlasting Pea*), 96, red, white.
- Lewisia rediviva*, 6, pink. Requires sun and dry situation.
- Liatris pychnostachya*, 3, purple, magenta.
- Linum flavum*, 10, yellow. Likes sun and dry situation.
- Lobelia fulgens*, 30, spikes of intense scarlet.
- Lupinus polyphyllus*, 36, blue, white.
- Lychnia Alpina*, 6, rose colour.
- " *fulgens*, 18, scarlet.
- " *grandiflora*, 12, bright red. Delicate in habit.
- " *Chalcedonica*, 24, scarlet, white.
- viscaria flore pleno*, 12, purple.
- Lysimachia nummularia* (*Creeping Jenny or Moneywort*), trailer, brilliant yellow.
- " *verticillata*, 12, yellow.
- Lythrum roseum*, 36, rose colour.
- " *salicaria* (*Purple Loosestrife*), 36, purple.
- Mimulus cardinalis*, 24, marlet.
- " *moschatus* (*Musk*), 6, yellow.
- Morina longifolia*, 24, purplish scarlet.
- Myosotis alpestris*, 3, blue, with yellowish eye.
- " *disstisflora*, 9, deep sky blue.
- " *palustris*, 9, blue, with yellow throat.
- Nierembergia gracilis*, 6, white, veined with lilac.
- Oenothera acaulis*, 6, white.
- " *Fraseri*, 18, yellow.
- " *macrocarpa*, 12, pale yellow.
- Omphalodes verna*, 6, blue.
- Opuntia Raffnesquiana*, 12, yellow, with handsome fruit. A Cactus hardy on dry rockwork.
- Orobus vernus*, 12, purple.
- Paeonia officinalis*, 24, crimson, scarlet, pink, white.
- " *tenuifolia*, 18, deep crimson.
- Papaver bracteatum*, 48, brilliant scarlet, black spot at base of petal.
- Pardanthus Chinensis*, 12, orange. Likes shelter.
- Pentstemon barbata coccinea*, 36, rich scarlet.
- " *Jaffranus*, 18, blue, with purple stamens.
- Phlox decussata hybrida*, 30, various colours.
- " *setacea*, 4, pale pink, spotted with purple.
- " *subulata*, 4, pink, darker in centre.
- " *verna*, 6, puce red.
- Phytolacca decandra*, 100, white changing to pink.
- Platycodon grandiflorum*, 30, blue.
- Polemonium caeruleum*, 24, blue, white.
- Polygonatum vulgare*, (*Solomon's Seal*), 24, white, tipped with green.
- Polygonum Sieboldii*, 50, white, with large foliage.
- Potentilla hybrida*, 18, purple, red, yellow, and various colours.
- Primula acaulis* (*Common Primrose*), 6, yellow, and various colours. Double varieties, white, lilac, crimson, purple.
- cortusoides amena*, 1, purple. Better for rockwork or pot culture than for the open border.
- " *elatior* (*Polyanthus*), various.
- " *Japonica*, 15, purple, crimson, lilac, white.
- Palmonaria Sibirica*, 36, blue.
- " *virginica*, 18, blue.
- Ramondia Pyrenaica*, 6, violet, purple, orange centre.
- Ranunculus aconitifolius*, 12, pure white and double.
- " *acris*, 24, golden yellow, and double.
- " *Asiaticus* (*Persian Ranunculus*), 12, various.
- Sanguinaria Canadensis*, 6, white, with orange stamens.
- Saxifraga cotyledon*, 18, white, in pyramidal spike.
- " *crassifolia*, 9, dark pink.
- " *umbrosa* (*London's Pride*), 9, white, dotted with pink and yellow.
- Scabiosa caucasica*, 24, pale blue.
- Schizostylis coccinea*, 18, scarlet.
- Sedum tabarium*, 12, pink, in large bunches.
- Silene Schafta*, 9, rosy purple.
- Soldanella Alpina*, 3, dark bluish purple.
- Spigelia Marylandica*, 12, red, with yellow interior.
- Spirea aruncus* (*Goat's Beard*), 60, white, chiefly desirable for its fern-like foliage.
- " *filiipendula flore pleno*, 18, white.
- " *palmata*, 24, crimson, white.
- Statice Incana*, 18, pink or mauve.
- " *sinuata*, 24, blue, in spherical bunches.
- Thalictrum aquilegiifolium*, 36, white.
- " *glaucum*, 60, yellow.
- " *purpureascens*, 36, yellow.
- Thiadante dubia*, quick-growing ornamental climber, with bell-shaped yellow flowers.
- Tricyrtis hirta*, 30, white, spotted with purple.
- Trillium grandiflorum*, 12, pure white.
- Tritoma pumila*, 12, orange.
- " *uvaria* (*Red-hot Poker Plant*), 36, spike bright red at top, orange below.
- Trollius Asiaticus*, 12, orange.
- " *Europaeus*, 12, golden yellow.
- Tussilago fragrans*, 12, white.
- Valeriana rubra*, 18, red.
- Veratrum nigrum*, 48, white, on straight stem.
- Verbascum Phoeniceum*, 48, yellow, in spikes.
- Vinca major* (*Periwinkle*), 18, trailer, bluish lilac.
- Viola cornuta*, 3, various tints of blue.
- " *odorata* (*Common Violet*), 3, various colours.
- Zauschneria Californica*, 12, scarlet.

HIBISCUS.

The members of this genus are for the most part beautiful and showy plants. Whether the hardy sorts be planted in mixed or shrubbery borders, or the more tender varieties be grown for in-door decoration, they are all alike characterised by the size and varied colours of their flowers.

Those intended for in-door culture require a compost of fibrous peat and rich fine loam with a large proportion of sand. A little charcoal in the soil is often bene-

ficial. The hardier sorts like a light sandy soil, and are propagated by sowing seeds or by cuttings. The stove and greenhouse plants are propagated from seeds sown over gentle bottom heat, or by cuttings taken early in the spring, say April, and set in a close frame. The best known varieties are *Hibiscus Africanus*, otherwise *H. Trionum*, or Bladder Ketmia, yellow with a purple centre, hardy annual, $1\frac{1}{2}$ feet in height, *H. pedunculatus*, rosy pink, beautiful, a greenhouse shrub 3 feet in height; *H. rosa-Sinensis*, or Chinese Rose with flowers of



various colours from 10 to 15 feet in height; *H. coccineus*, bright scarlet flowers from 4 to 5 feet high, and *H. roseus*, with large pink flowers, from 4 to 5 feet high.

HOLLYHOCK.

There is no finer ornament of the autumnal flower garden than the hollyhock. Its noble, tapering, spike-like stem and rich rosettes of flowers clustering round the footstalks of the leaves, and its paniced head and luxuriant massive leaves, render it the most effective occupant of a gap in the shrubbery, or in the back row of an herbaceous border, or even in rows in the flower garden, or in beds by themselves,

their variety of colour renders them most attractive objects.

Propagation by Seeds.—The seeds of the hollyhock should be gathered only from the most perfect plants, in which the flowers have been round, the florets thick and smooth on the edge, the colour and decided, and the flowers close to each other on the stem. About the middle of March, or not later than the first week in April, the seed bed should be prepared, 4 feet wide, with an alley on each side. The soil should be rich and in good heart; such soil as would suit a cabbage will grow the hollyhock in tolerable perfection. Trench the bed 2 feet deep, throwing the top spit to the bottom, and bringing the second spit to the surface, if both are of the same character of loamy, somewhat tenacious soil, breaking up the surface thoroughly. On this bed, raked smooth, sow the seed so thickly as to come up an inch apart, and sift over the seeds some rich dry soil, so as to cover them for about an inch. Seeds of the hollyhock may be obtained from any nurseryman or seedsman, as may seedlings also for planting out.

Treatment of Seedlings.—When the young plants come up and begin to grow, the weeds must be kept down, and vigorous growth encouraged by watering in dry weather. In June they will bear removal to a nursery bed, prepared in the same manner as the seed bed. If the seedlings have been growing vigorously, the roots will be strong, and must not be broken in taking up; this may be prevented by soaking the bed thoroughly the night previous to removal, and lifting the plants cautiously with a fork inserted under them, as in lifting potatoes. Plant them in the new bed 6 inches apart each way, using a dibber, making a hole large enough to receive the roots, and pressing the earth round them by making another hole on each side with the point of the dibber,

watering the bed thoroughly when planted. When dry and somewhat settled, rake the beds smooth, giving the same care as to weeding and watering when dry, as well as destroying slugs, earwigs, and insects.

Planting in Blooming Quarters.—In the autumn they will be strong plants, fit to put out where they are to bloom. If they are intended to bloom in rows where they stand, every other plant must now be removed, so as to leave them one foot apart all over the bed ; here they may be supported by strong stakes placed at both ends of each row, and a strong cord carried from one to the other, to which the plants are to be tied. As hollyhocks come into bloom, in the second year, every single flower which does not exhibit some desirable character of habit or colour should be thrown away before they begin to ripen seed ; the majority will be in this category. Those selected for further experiment should be cut down to within 3 inches of the ground, the earth round them stirred with a fork, to loosen the soil and let in the air, having previously named or numbered them in your book, and described the qualities for which they were selected.

Propagation by Cuttings.—As soon as the first flowers of an old plant open sufficiently to judge of the flowering, the superfluous side branches having no flower buds may be taken off, with two or three joints and leaves. Cut the shoot through with a clean cut, just under the lower joint, leaving the leaf entire ; cut it also at about 2 inches above the joint—either joint will do, provided they have growing eyes, with a leaf and piece of ripened wood to support the bud until roots are formed. These cuttings, planted in a light sandy soil, placed under a hand-glass, and watered occasionally, and shaded from the sun, will require little further care except keeping clear of weeds and dead leaves. When rooted, pot them off in 60-sized pots, and

put them in a cold frame where they can remain during the winter. In spring, plant them out in the open ground where they are to flower, the colours being arranged so as to harmonise with other parts of the garden, taking care to furnish the roots with the proper soil.

HU'MEA.

A remarkably handsome plant, invaluable for decorative purposes, whether in the hall, the conservatory, or dispersed in pots about the lawn, pleasure-grounds, or terraces. Planted in the centres of beds or mixed borders, its majestic and graceful appear-



HUMEA ELEGANS.

ance renders it a most effective and striking object ; in long mixed borders, if placed at intervals in irregular positions, it breaks that monotonous appearance which most persons so much dislike. Indeed, in any position, this plant stands unrivalled as a garden ornament. The leaves, when slightly rubbed, yield a powerful odour. When well grown it has been known to be 8 feet high and 4 feet in diameter. It succeeds best in light rich soil. Young plants grown from seed like a compost composed of loam freely incorporated with thoroughly decayed manure and a small quantity of charcoal. The best known of the varieties is *Humea elegans*, a half-hardy

biennial, with flowers brownish-red, crimson, or pink in colour.

HU'MULUS.

A genus of plants of which the best



LE HYACINTH.

known is *Humulus Lupulus* or the Common Hop. It is a perennial climber delighting in a rich deep loam. The flower-like fruit is used in brewing. As far as the gardener is concerned, it is chiefly valuable to him as a strong and quick-growing climber which will soon cover a summer house or any railing or fence. It is propagated by seeds or by divisions of the root made in spring.

HYACINTH.

Nothing is easier than the culture of hyacinths. The best soil for them, and indeed for all other bulbs, is composed of equal parts of turf loam and well-rotted cow or horse manure, at least two years old, with a sixth part sharp gritty sand. But they will grow in almost any soil, or indeed without soil at all, in damp moss, cocoanut-fibre refuse, water, or sand.

Choice of Bulbs—Early Management.—The first selection of hyacinths, as of most other bulbous roots, arrives in London from the 20th of August to the 5th of

September; orders should therefore be given for them as soon after that time as possible. If it be inconvenient to plant them immediately, they may be placed on a cool dry shelf till wanted. The great point is to choose good, firm, well-ripened rather than large bulbs, although, of course, the larger the better if they are also well ripened, and to pot or start them early, say in October, when they should be purchased of the seedsman. Then, by keeping the tops in darkness, and the roots, if possible, a little warmer than the tops, get the roots as much in advance of the stem as possible. If the pot or glass is once full of roots, while the stem is only starting into growth, a good bloom, with ordinary care, is almost certain. In this condition they may be removed to a forcing pit, with a temperature of 55°, to a conservatory shelf, pinery, or peach house at work, or a sitting-room or kitchen window, with almost entire certainty of success. This, however, is speaking generally of the culture of this beautiful flower. It will be necessary to



DOUBLE HYACINTH.

describe in detail its culture under various conditions and circumstances.

HYACINTHS IN MOSS.

Fill a china bowl or other vessel with fresh green moss cleared of all impurities. Let this be well wetted, and lightly pressed

down; in it plant the hyacinth bulbs, and thoroughly incorporating the whole covering them lightly with some of the greenest moss. As soon as the hyacinths are planted, place the bowl in a dark cool place for about three weeks; afterwards, *keep it near a window, where the bulb will have plenty of light and air. Be careful that the moss is always kept damp, and that the top moss round the bulbs is changed frequently, in order that the surface may be kept green.* The moss best suited to this purpose is that found on banks, or grown upon the roots of old trees.

HYACINTHS IN OPEN GROUND.

If the soil be light or medium, it simply requires to be deeply dug and well worked; if heavy, besides deep digging and well working, the bulbs should be surrounded with sand, or, better still, two good handfuls of cocoa fibre; if wet or subject to occasional floodings, drain the ground with a series of drains, 3 feet deep and 10 feet apart, or raise the bed 6 inches above the general level. When manure is added, thoroughly rotted cow-dung or leaf soil is best; and when winter protection is given, use long straw laid loosely on the bed, and hooped down to prevent its littering the garden, or cocoa fibre—both are equally good, and afford the best protection that can be given; but they should be removed as soon as the plants begin to show.

In planting, the crown of the bulb should be 4 inches under the surface, and to produce a very effective display the bulbs should be planted 6 inches apart, but many persons plant them 8 or 10 inches from each other.

HYACINTHS IN POTS.

To cultivate the hyacinth successfully in pots, a free porous soil is indispensable, and one composed of equal parts of turf-loam, rotted cow-dung, and leaf soil, adding about one-eighth part of silver sand,

and passing it through a rough sieve, is undoubtedly the best compost for the production of handsome flowers. As this, however, cannot always be commanded, use, instead, road scrapings a year or two old, or good garden loam, not of a retentive nature, mixed with silver sand. Cocoa fibre and charcoal, mixed with rotted cow-dung and loam, all in equal parts, make a fine mixture in which to grow hyacinths.



HYACINTHS IN POT.

The size of the pot must be regulated by the accommodation and requirements of the cultivator; for one bulb a 4- or 4½-inch pot will grow the hyacinth well; for three bulbs a 5½-inch pot will be sufficient, and here it may be said that hyacinths cultivated in groups are much more effective than when grown singly. At the bottom of the pot place over the hole a piece of potsherd and some charcoal, and on this some rough pieces of turf-loam to insure good drainage; then fill the pots with the prepared soil to within an inch of the top, placing the bulb in the centre, or, if three, at equal distances apart, pressing them well into the soil, and

HYACINTH—HYDRANGEA.

filling up, leaving only the crown of the bulbs uncovered; moderately water, and place them anywhere out of doors, on coal ashes or anything that will secure good drainage and at the same time be objectionable to worms; then with coal ashes, leaf soil, or old tan, or better still, common cocoa fibre, fill up between the pots, and cover over 2 or 3 inches. In five or six weeks the pots will be full of roots, and may then be removed at pleasure. For a few early blooms some may be removed at the end of three or four weeks and placed in a gentle hotbed, warm greenhouse, forcing-pit, or viney, but they must be kept close to the glass, to prevent them from growing tall and unsightly. At first they should be forced very gently.

HYACINTHS IN SAND.

To insure an effective display when the hyacinth is grown in sand it is necessary to plant thickly. Push the bulbs into the dry sand, leaving only the top visible, and to fix the sand, the vessel should be immersed in a pail of water; also, to prevent any subsequent displacement of the sand, and to secure for the plants a sufficient supply of moisture, this operation should be repeated once a week, or oftener if required, a bath of two or three minutes' duration being sufficient; and if the water used be tepid, it will be all the better, as it encourages the development of the flower. An occasional watering of tepid water overhead, through a fine rose, will free the plants from dust, and keep them healthy and vigorous. It should be said that cocoa fibre and charcoal mixed together is a much better medium than sand.

HYACINTHS IN WATER.

In growing hyacinths in water it should be said that this is a method which is not recommended, because this mode of culture so exhausts the bulb that it becomes either

useless for transfer to the borders, or takes so long in recovering itself that it is some years before it is in a condition to send up a decent flower spike. But if this course be determined on, with regard to the water supply, never use spring water if you can get clean rain water. Place the bulb on the glass, and let the water just touch its base; for three or four weeks keep it in a dark, cool situation, but avoid a damp, close atmosphere.

When the roots have grown 2 inches, remove the water half an inch from the base of the bulb. All disturbance of the roots should be avoided; therefore never change the water while it remains sweet: as a purifier, place a piece of charcoal in the glass. Avoid a close, hot room, for the heat and closeness tends to induce long stems and small flower spikes. Choose an airy situation, and place the glass in the lightest and sunniest position, turning it once a day. Never allow dust to remain either on the bulb, leaves, or flower; once a day, or oftener, remove it with a camel-hair brush and water.

Carefully guard against changes of temperature, especially from heat to cold, and never remove the plants from a hot room to a cold one; and when the water is changed or the glasses filled up, the chill must always be taken off the water. Never use a support till the plant requires .

A preference is generally given to dark-coloured glasses over clear ones, on the supposition that the hyacinth grows better in them; but experience has shown that the hyacinth will do as well in the one as in the other; therefore those who delight in watching the growth of the roots, as well as the development of the flower, should buy the clear glasses.

ICE PLANT—*IMPATIENS*.

hortensis—is a Chinese shrub, half hardy, imported into England about the year 1790 by Sir Joseph Banks. It thrives best in a rich soil, and requires plenty of water. When the plant has done flowering, its branches should be cut in. Blue hydrangeas are much admired. It is some peculiarity in soil and situation which produces this variety. Blue flowers may in general be procured by planting in a strong loam and watering freely with soapsuds, or, what is better, with a solution of alum or nitre. Propagation is effected by division of large well-established plants or by cuttings of half ripened shoots, put in at any time

for garnishing, as the leaves are ornamental in proportion to their size, the soil should be of the richest possible description; and the few plants that will be necessary should be placed in a warm sheltered corner. Unless the soil is in itself suitable, dig pits about 2 feet 6 inches apart, and fill them with very light rich compost, allowing about a barrowful to each couple of pits.

Time and Manner of Sowing.—Sow the seeds in a pot filled with rich light soil early in April; cover lightly, and place in a gentle heat. As soon as the plants are strong enough, pot them in small pots and replace in the warmth. When the plants are well established, gradually harden them for planting out.

Planting and After-management.—Plant out about the end of May, or as soon as the plants are strong and properly hardened, and all danger of frost is over. Keep them well supplied with water until the roots get hold of the soil. When once fairly established, they will only require to have the ground kept free from weeds, and the shoots pinched out, so as to prevent their being overcrowded. In hot, dry weather weak manure water may be given frequently with advantage.



ICE PLANT—*MESEMBRYANTHEMUM CRYSTALLINUM*.

when the branches are cut in after flowering under shelter.

PLANT.

Although commonly known as the "Ice Plant," from the ice-like excrescences with which its leaves are bespangled, its proper name is *Mesembryanthemum Crystallinum*. It is a useful and effective plant for rock-work, and the leaves and sprays are often utilised for garnishing.

Preparation of Soil.—This plant will thrive in any fairly good garden soil, and in a dry and sunny situation, but if wanted

IBERIS.

The iberis is better known as candytuft, and will be found described under that name.

IMPA'TIENS.

Handsome border plants, called also *Noli me tangere*, from a curious property in the seed vessel, which springs open as soon as touched. The common balsam, or *Impatiens Balsamina*, is included in this genus (see *Balsam*), and under this name the general culture for plants of this class is described.

I. flaccida is a fine species, with fine purple vinca-like flowers and broad leaves. Another fine plant of this genus is *I.*

Sultani, with beautiful scarlet flowers, but this is a greenhouse plant, and requires much care in its culture and management. All of these plants do best in rich loamy soil.

INDIAN AZALEAS.

The Indian azaleas require more delicate



IPOMOE'A LIMBATA.

treatment than their more hardy congeners, the Ghent azaleas. They live and grow in a low temperature, however, and are not materially injured by a few degrees of frost; but while growing, a moist warmth and equable temperature are essential to their flowering properly. For culture and management, see *Azalea*.

INTERMEDIATE STOCK.

The Intermediate Stock, *Mathiola annua intermedia*, is a half-hardy biennial supposed to be a cross between the Ten week and Brompton stocks. It is dwarf and branching, and in the early summer months constitutes the principal feature in furnishing pots, vases, window boxes, &c. It is also of great value in filling flower-beds, for an early summer display.

INOPSISIDIUM.

A plant so called from its violet-like appearance. Only two kinds are known—

Inopsisidium acaula, with white flowers tinged with purple, or lilac flowers, and *I. album* with white flowers. Both

are small, not exceeding the height of 3 inches. These profuse-flowering hardy annuals, which are reproduced by self-sowing, thrive in the shade on any rich, damp soil, or on rockwork. They are useful for pots and vases in window gardening.

IPOME'A.

Beautiful climbing plants of various colours. The seed should be raised under glass in April and the young plants set out in May. *Ipomea limbata*, with its purple flowers, looks well in contrast with *I. canariensis*. All the ipomeas require a rich light soil. In some situations the plants will shed their seed and come up from year to year in the open ground. The annual varieties are noted in most seedmen's catalogues.

IRIS.

A genus of hardy herbaceous plants with long running tuberous roots and flowers of beautiful colours, mostly white, yellow,



FIG. 1.—GERMAN IRIS.

brown, and purple, having six petals—of which the three outer ones are drooping or reflexed, and the three inner ones erect. They are usually divided into two sections—the Irises proper, or German

Irises, and the Xiphions, or English and Spanish Irises. The height of the plant is from 18 to 24 inches, while its cultivation is unusually simple, succeeding in any ordinary light rich garden soil. The Iris should be planted in clumps of three or more, and if allowed to remain undisturbed, they will each succeeding year become more effective; planted in rose or rhododendron beds, they are most valuable. Time of planting and purchasing the same as that recommended for the hyacinth.

The yellow iris or water flag, *Iris pseudocanna*, with its brilliant yellow blossoms pencilled with purple-black, and the Ger-

In Fig. 2 the form and parts of the bearded iris is clearly shown. In this the lower petals A are the "falls" technically so called; B, the "standards"; C, the petal-like "stigmas"; and D, the "beard."

IRISH IVY.

The Irish Ivy, *Hedera canariensis*, or, as it is sometimes called, the Giant Ivy, is very ornamental. It is also extremely useful, as its growth is so rapid that a screen may be formed of it in a very short space of time. It requires to be clipped once or twice a year freely.

IRISH YEW.

This is an upright shrub with very dark foliage. It has a very good effect when standing alone on a lawn, and may be introduced with advantage into shrubberies in contrast with other shrubs of lighter foliage.

ISME'NE.

A genus of free-flowering handsome sweet-scented summer-blooming plants, which should be cultivated in every garden. They are now included in the genus *Hymenocallis*. They grow freely on a south border in a mixture of light loam and rich vegetable soil, but require shelter from cold winds, and good drainage. They make handsome plants for in-door decoration.

The bulbs must be taken up and placed under protection during the cold months, for they will not stand the winter out of doors.

The culture the same as recommended for hardy and half-hardy amaryllis. The best-known variety is *Ismene calathinum*, or Peruvian Daffodil, with a large white cup flower.

IVY.

There are many kinds of this wall-loving climber, one of which, the Irish ivy,

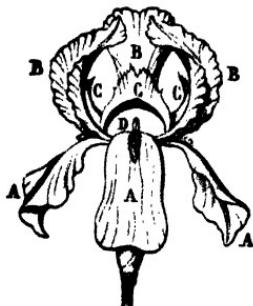


FIG. 2.—FLOWER OF BEARDED IRIS, SHOWING PARTS.

man or common Iris, *I. Germanica* (Fig. 1), with purple and lilac flowers, and bright yellow beard, common enough in town gardens, may be taken as representative examples of the first section. The English and Spanish, or bulbous-rooted, irises are smaller in every way, being less in height, and having smaller flowers, which are, however, most brilliant and beautiful in colour and pencilling. Of these, fitting representatives will be found in *I. histrio*, with lilac-purple and yellow flowers; *I. Persica*, yellowish-lilac, and exhaling a perfume like the violet; and *I. reticulata*, with flowers of violet-purple, with yellow markings on the lower petals.

has been mentioned above. The common sorts have green leaves and purple berries, growing in clusters; but there are many varieties with gold and silver splashes on the leaves, such as *Hedera helix foliis argenteis* and *H. h. foliis aureis*, which are often spoken of as gold and silver.

Any kind can be easily propagated by slips planted in spring, in sandy soil in a north border. The slips must be gently watered in dry weather. Common ivies like moist, rich soil; but the variegated sorts, which are not so hardy or so strong in constitution, like a lighter soil wherein to grow.

IX'IA.

An exceedingly pretty Cape flowering-bulb, producing its graceful flowers in long slender spikes, and in the greatest profusion; succeeds well on a warm south border, in a mixture of sandy loam and leaf mould, or peat. Propagated by offsets or by seeds sown in sandy loam about September, and placed in a cool frame. They may be grown in pots for the greenhouse or conservatory, and for this purpose the bulbs should be potted in the autumn.

IXIOLIRION.

A genus of half-hardy bulbous plants, having flowers either white or of different shades of blue. The bulbs will do well in a border of light loam, well drained, and having a southern aspect. The bulbs should be planted out in the spring, and taken out of the earth in autumn and allowed to dry off, for preservation during the winter.

JACOBÆ'A.

This name has been assigned by seedsmen to a variety of *Senecio*, generally known as "American Groundsel." The annuals so called from a useful and exceedingly showy class of gay-coloured, profuse-blooming

plants, remarkably effective in beds or ribbons. They delight in a light rich soil. The Jacobæa is of many colours, chiefly blue, crimson, and purple. It may be raised from cuttings, as verbenas, &c. All the sorts grow freely from seeds.

JACOBÆ'A LILY.

The flower to which the name of Jacobæa Lily is sometimes given is one of the genus *Hippeastrum*, which is composed of about fifty species of bulbous plants. They must be grown in pots within doors, in well drained, rich, and heavy loam, to which bone dust and charcoal should be freely



JACOBÆA. DOUBLE VARIETY.

added. They are propagated by offsets. *Hippeastrum formosissimum*, or the Jacobæa Lily, has dark red flowers, which appear in July; and *H. Equestre*, or Barbados Lily, flowers of various colours, orange, green, and scarlet. There are various hybrids.

JASMI'NUM.

Of the fragrant free-flowering shrubs called Jasmines, there are many hardy varieties. The best known are *Jasminum officinale*, the common white jasmine, which has white blossom exhaling a delicious perfume, and *J. rotundifolium*, with flowers of a brilliant yellow. *J. undiflorum*, so called because the yellow

blossoms appear in the winter months before the leaves come, is also a hardy and useful deciduous climber. There are several hothouse varieties extremely beautiful, as *J. grandiflorum* and *J. odoratissimum*.



THE JONQUIL.

All the jasmines are easily propagated by cuttings in sandy soil, covered with a hand-glass.

JONQUIL.

The jonquils admit of the same culture as the other narcissi (see *Narcissus*). They are hardy bulbs, and may be left in the ground several years without any injury; care, however, must be taken not to shorten or cut off their leaves. Planted four, five, or six in a pot, they are useful in a conservatory on account of the beauty of the yellow blooms and the fragrance they exhale.

KALMIA.

This pretty, hardy, evergreen shrub, known also by the name of the American Laurel, is a native of North America, and should be treated as rhododendrons, &c., with bog earth or scil well mixed with peat. The plants should be placed in a moist situation. Kalmias are quite hardy. They may be propagated by seed sown in pans, in peat and sand, and placed in a cold frame, by layers, or by cuttings of young shoots, taken after the plants have

bloomed, and set in peat and sand in a shady position under a handglass. With care the plants thus obtained may be transplanted at almost any season. There are five or six species, but the best known is *Kalmia latifolia*, also called the Calico Bush, with rose-coloured and white flowers.

KALOSANTHES.

A plant allied to the house-leek, bearing a flower like the common white jessamine —white at first, but assuming a reddish tint as the flower fades. The plant under consideration is properly called *Crassula jasminea*, or the jasmime-flowered Crassula, but it is also known as *Roechea jasminea* and *Kalosanthes jasminea*. It flowers in April and May. It is propagated by cuttings, which, like the Echeveria, should be laid aside for two or three days before planting, in order to dry, in which state they are better capable of sending out rootlets. They should be sown in a mixture of brick rubbish and half loam,



KAULFUSSIA AMELOIDES.

in which well-established plants should also be grown.

KAULFUS'SIA.

This little free-flowering annual, of good compact growth, are, when well grown, exceedingly effective in beds or mixed borders. They grow freely in any good

garden soil, but seed should not be sown earlier than the third week in April. The proper name of this annual is *Charilis*, but it is also known as *Kaulfussia amelloides*. It bears a flower with blue petals on florets set round a disc, which is either blue or yellow. The Kaulfussia, properly so called, is a curious stool fern, with large fronds resembling chestnut leaves in shape.

KERRIA.

A hardy deciduous shrub throwing up long and slender branches, sending out short twigs furnished with pretty light green serrated lanceolate leaves, and bearing orange-yellow flowers of a ball-like form. *Kerria Japonica* is the only species cultivated in gardens, and this is generally called *Cochrorus Japonica*. It is easily propagated by cuttings, layers, or divisions of the plants. It grows from 3 to 4 feet in height, but in the extreme southern parts of England it will attain a height of 6 feet.

LANTA'NA.

Although some of the Lantanas, as, for example, *Lantana Camara*, range from 6 feet to 10 feet in height, yet they may be described as a genus of dwarf bushy shrubs, half-hardy perennials, from 12 inches to 18 inches in height, thickly studded with pretty miniature verbena-like blossoms of varied colours and changing hues—from snow-white with primrose centres to delicate pink and rose with white discs, and from bright rose-lilac to orange and scarlet with creamy centres. For the conservatory and flower garden they are alike valuable. Seeds sown in March make fine summer and autumn blooming plants. They succeed best in dry, warm situations, and in light rich soil. They are also propagated by cuttings taken about the end of August, and set in small pots in good loam, lightened by old and well-rotted manure

from a spent hotbed. These must be kept in a cool house during the winter, and will make nice plants in the spring. There are many named varieties, which may be procured from nurserymen.

LA'PAGERIA.

A beautiful greenhouse climber, producing pretty bell-like flowers, either white or rose-coloured. They require a rich, light soil, plentifully mixed with sand and peat. They are propagated by seeds sown, as soon as ripe, in gentle heat, or by layers,



which is the best mode of obtaining strong, quick-growing plants. The pots in which they are grown must be subject to attacks of green fly in spring, and require care and watchful attention in this respect. The best-known species are

L. r. alba, which present a beautiful appearance when trained over a greenhouse wall.

The Larkspur, or Delphiniums, form genus of most generally cultivated and ornamental annuals, biennials, and perennials, combining unusual richness with an endless variety of colours, all extremely

beautiful and pleasing ; the flowers are produced in the greatest profusion, and the plants in beds, masses, or ribbons are strikingly effective ; indeed, few plants are so generally useful and valuable for their decorative qualities either in the garden plant out when large enough, care being taken not to disturb the roots. Give support as soon as they are tall enough, twiggy sticks being placed in ground between plants, and well water during hot weather.



LARKSPUR.

or, when cut, for vases. The annuals are reproduced by seed sown in any good garden soil in a warm border in April, or earlier in pans under shelter, to be planted out when sufficiently advanced in growth. The perennials, especially named varieties, are best propagated by divisions or cuttings. They may be also grown from seed. The tall-growing varieties scattered in strawberry borders produce a charming effect when backed by the green foliage of the shrubs. See also *Delphinium*.

LATHYRUS, OR SWEET PEAS.

These hardy annuals have during the past few years been greatly improved, and comprise endless varieties. Their delightful fragrance, choice colours, and all-round excellence justifies their popularity. Sow thinly any time between February and May in well-trenched ground, in well-manured soil, or sow thinly in pots and

LAURUS

The ordinary laurel does not belong to this genus, which includes two species only, namely, *Laurus*, or *Lindera Benzoin*, and *L. nobilis*, the true laurel—commonly known as the Sweet Bay. This is a hardy evergreen shrub, and is propagated by cuttings set in a moist and shady situation, in light loam mixed with sand, and protected by a hand-glass.

LAVANDULA, OR LAVENDER.

There are various species of this genus, but the best known is the common lavender (*Lavandula vera*) of the garden and market garden, whose dried flowers are so much sought after for their delicious fragrance. It is propagated by cuttings taken in autumn, and struck under a handlight in any light garden soil. Lavender, it may be said, is grown extensively for the manufacture of lavender-water, and the appearance of a large expanse of ground filled with lavender bushes is remarkable for colour, to say nothing of the odour that is exhaled from them.

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LAVATERA.

A genus of very profuse-flowering showy plants, including annuals, biennials, and perennials, which are exceedingly attractive as a background to other plants, or for woodland walks and wilderness decorations, growing freely in any soil. The best-known sorts are *Lavatera trimestris*, with rose-coloured flowers, 3 feet, hardy

annual, and *L. arborea*, or Tree Mallow, with violet flowers, 5 feet, hardy biennial.

LEPTOSIPHON.

A charming tribe of hardy annuals which should now be known under its proper



LEPTOSIPHON HYBRIDUS.

generic name of *Gilia*, although the seedsmen still keep to the old name in their price lists. *L. densiflorus*, with its pretty rose-lilac flowers, and *L. densiflorus albus*, with its pure white blossoms, are exceedingly attractive in beds or ribbons. *L. hybridus*, *L. aureus*, and *L. laciniatus* make pretty low edgings, and are very suitable for rock-work; they all make nice pot plants, and succeed in any light rich soil.

LEUCOJUM, OR SNOWFLAKE.

These are very pretty hardy bulbs with white blossoms tipped with green, resembling those of the snowdrop, but much larger in size. *Leucojum aestivum*, or Summer Snowflake, flowers in May, but *L. verum*, the Spring Snowflake, which is the most valuable, blooms in March, but if forced will flower earlier. It is much prized for the sitting-room. The bulbs are perfectly hardy and will grow in any garden soil. They should be planted in the autumn in clumps about 3 inches deep.

LILUM, OR LILY.

The liliums, or lilies, now in cultivation

are both various and beautiful, and form a class of plants which of late has been largely extended, and which is really very valuable both for the greenhouse and the garden. The names of the principal varieties have been given in the list of bulbs (see *Bulbs, List of*). The different kinds of lilies are so numerous that it is not possible to find space here to specify them, but it may be said that they are, for the most part, hardy bulbous perennials, and that all require very much the same kind of culture.

General Culture in-doors.—Use a good mellow soil, composed of equal parts of leaf mould and loam, with a little peat, and one-sixth of silver sand. A 12-inch pot, with six bulbs planted in it, will furnish a group of no ordinary beauty: smaller-sized pots will require fewer bulbs. Place at the bottom of the pot a piece of potsherd, and over it some pieces of wood charcoal and rough fibry soil to secure good drainage, then fill up with the compost. When planted, the bulbs should be



LEUCOJUM VERNUM, OR SPRING SNOWFLAKE.

covered one inch, and the soil made close by pressure: they should be treated in their first stage of growth precisely as hyacinths grown in pots, except that they should remain buried in ashes or coco-

fibre till they begin to indicate a top-growth. Those intended to flower early should be placed under glass, while such as are for late blooming should remain out



WHITE LILY.

of doors in a sheltered situation, the pots plunged to the rim in ashes or cocoa-fibre.

Lilies in Pots.—Bulbs grown in pots may be preserved, as said, in the dormant state in cold pits or frathes until spring, or on the marginal spaces of cold greenhouse paths, or stages where preserved from water drips. In the first position, the pots may be plunged in any dry material, as tan, leaf mould, &c. Many, among which may be named *Lilium Catesbeii*, *L.*

and *L. superbum*, succeed best in a bed of peat or heath soil; and where that is not attainable, equal proportions of half-decomposed leaf mould, wood ashes, and decayed branches, thoroughly mixed with river sand to one-third of the whole proportions, is a good substitute. In planting, cover each bulb with a clean stratum or layer of the last-named material. *L. m.*, *L. cordifolium*, *L. Japonicum*,

and *L. Wallichianum* or *Neilgherrense* are not as yet proved strictly hardy in all localities, and therefore would be best potted after the blooming season, and preserved in a cold pit or frame, to be again replanted in the spring. Where this precaution is inconvenient, the surface pots of these kinds in the beds should be covered with a heavy layer of dried tan, wood ashes, or sawdust. The remaining kinds are recognised as hardy species, and will thrive in good sandy loam or a mixture of loam and peat.

General Culture out of Doors.—If the land be of an adhesive nature, it should be removed to the depth of 2 feet, and replaced with a rich, free soil, or else the bulbs should be planted in 5-inch pots, and early in May turned out where intended to bloom. Light or medium soils will only require deep digging and well working, with the addition of some thoroughly rotted manure. Plant the bulbs 5 inches deep, and for the first winter place on the surface a few dry leaves. The



LILUM SUPERBUM.

bulbs should not be disturbed oftener than once in three years, as established patches bloom much more profusely than those taken up and divided annually.

The varieties best adapted for in-door culture are *L. atrosanguinum maculatum*, *L. lancifolium album*, *L. punctatum*, *L. roseum*, *L. rubrum*, and *L. longiflorum*.



LILY OF THE VALLEY.

The Martagon varieties are very effective in borders; so also are the common White Lily, *L. candidum*, the Orange Lily, *L. croceum*, and *L. Chaledonicum*, or Scarlet Turk's Cap.

LILY OF THE VALLEY.

To grow lilies of the valley (*Convallaria majalis*) to perfection, the roots should be set in bunches one foot apart and covered with a dressing of well-rotted manure before the winter sets in. They can hardly be treated too liberally. If grown in pots for the greenhouse, by a little management a succession may be kept in bloom till June. Keep the pots perfectly dry and in a cool, shady place until their natural season is past, and by watering they soon come into foliage and flower. In buying of growers select plants with plump crowns; if these are potted, a cluster of flowering spikes will be thrown up in each pot; after flowering they may be turned into the border, where, in all probability, they will flower the following year.

LINARIA.

The name of a genus of plants containing

many species, mostly annuals and perennials. They will grow on rockwork or in any well-drained soil and position. *Linaria* or the Common Tordflax, being indigenous to Britain, and often found as a trailer on old walls. It has a pretty, round, indented leaf and a lilac and yellow flower, resembling that of a snapdragon in shape, only very much smaller. They like a light soil and are easily propagated by seeds or divisions of the plant. *L. saxatilis* is a pretty trailing perennial with yellow flowers. The sorts usually supplied by the seedsmen as annuals are *L. aurea reticulata*, a dwarf, bushy annual with small snapdragon-like flowers, purple in colour, flecked with gold; *L. bipartita splendida*, a pot plant, with red or purple flowers, and *L. Maroccana*, with dark, plum-coloured flowers.

LI'NUM.

A fine genus of annual and perennial free-flowering plants, with blue, rose, scarlet, or white flowers, among which stands distinguished for its beautiful saucer-shaped flowers of rich crimson-scarlet with crimson-black centre, *Linum grandiflorum rubrum*, Scarlet Flax, one of the most effective and showy annuals; having a slender and delicate habit of growth, and



LINARIA RETICULATA.

producing flowers in profusion for many months. *L. flavum*, with its golden-yellow blossoms, profusion and duration of bloom, forms a valuable contrast and

companion to the above. *L. luteum corymbiflorum*, with its beautiful straw-colour blossoms, also forms a pleasing contrast to *L. g. rubrum*, *L. campanulatum*, *L. flavum*,



LINUM GRANDIFLORUM

and *L. grandiflorum rubrum* do well in pots. The plants succeed best in a light rich soil.

LOBE'LIA.

A genus of exceedingly pretty profuse-flowering plants, of which the low-growing kinds make the most beautiful edgings. *L. speciosa*, a dark blue hybrid variety, forms an excellent contrast to *Cerastium tomentosum* and the variegated alyssum; *L. gracilis*, from its bush-like habit and profusion of celestial-blue flowers, is equally



beautiful in pots, beds, or when used as an edging: all the varieties of *L. Erinus* are valuable for hanging baskets, rustic-work, or vases, over the edges of which they

droop in the most graceful and elegant manner. The perennial species, with their handsome spikes of flowers, are exceedingly ornamental, and are valuable from their blooming in autumn, with gladioli, *Lilium lancifolium*, *tritomas*, &c. All the varieties grow freely from seed, and most of them from cuttings. Many varieties of the lobelia are used as bedding plants.

LONICERA.

A genus comprising all the trailing and climbing hardy and half-hardy deciduous or evergreen plants known to us as honeysuckles. They are admirably adapted for



covering walls, trellises, summer-houses, &c. They will thrive in any good garden soil and frequently in shaded positions, and may be propagated by cuttings and layers—indeed, a piece passed through the bottom of a pot and cut at a joint will soon take root in mould placed in the pot if kept moderately moist, and form an independent plant. *L. sempervirens* forms a beautiful greenhouse climber. *L. perfoliata* is the woodbine, or Common Honeysuckle. *L. Japonica* is the Japanese honeysuckle, which is chiefly remarkable for its pretty, variegated heart-shaped

leaves. There is a sort sold as the "Dutch" honeysuckle, which seems to be *L. punicea*, or the scarlet-flowered honeysuckle.

LOTUS.

The hardy varieties of this plant, also



SCARLET LYCHNIS.

known as Birds'-foot Trefoil, are well suited for ornamenting rockwork or dry banks. *Lotus Australis*, with its splendid spikes of rose-coloured flowers and dwarf habit, grows freely from seeds or cuttings placed in light soil. Other varieties are *L. corniculatus*, the common birds'-foot trefoil, with bright yellow flowers, and *L. Jacobaeus*, with dark purple flower, a greenhouse perennial. *L. Jacobaeus luteus*, yellow, 2 feet, from Cape de Verd Islands; half-hardy perennials.

Free-flowering garden plants, annuals or perennials, with long graceful spikes of bloom, colours rich and beautiful. Many of the varieties are of a stately, robust growth, which makes them exceedingly valuable for mixed flower and shrubbery borders, while the dwarf varieties make neat, trim bedding plants. Amongst the

most distinguished may be mentioned *nus Hartwegi* and varieties; *L. hybridus* and varieties; *L. Menziesi*, *L. magnificus*, *L. luteus*, and *L. subarnosus*. Many other sorts besides these will be found named in seedsmen's lists.

LYCHNIS.

A genus of hardy annual or perennial plants, among which is the garden flower—a perennial—known as Rose Campion. They thrive in any good garden soil, and especially in rich, light loam. They are easily propagated, the annuals by seeds and the perennials by division of the roots, in spring. Among the perennials *Lychnis Chalcedonica*, or Scarlet Lychnis, with its pretty scarlet verbena-like blossom, is perhaps the best known. Others are *L. C. alba*, with white flowers; *L. flos-jovis*; bright rose; *L. fulgens*, glowing crimson; *L. Huageana*, orange scarlet; and *L. speciosa*, dark rose. All these varieties are well worth growing.

MARIGOLD.

Well-known, free-flowering hardy and half-hardy annuals with handsome double flowers, of rich and beautiful colours,



producing a splendid effect, whether planted in beds, borders, or ribbons. The common marigold (*Calendula officinalis*) has large daisy-shaped flowers varying in colour from pale yellow to

deep orange. They are grown for the sake of the flowers which are dried and used in broths and soups. The African marigolds (*Tagetes erecta*), the tallest, are



FRENCH MARIGOLD.

also the most striking in large beds, mixed flower and shrubbery borders. The shorter French marigolds (*Tagetes patula*), in beds, or used as a foreground to taller plants, are invaluable, while the new brown and new orange miniature French varieties make splendid compact edgings to beds or borders. All sorts are propagated by seeds sown in March and April.

MARTAGON LILY, OR TURK'S CAP LILY.

For the culture of lilies of all kinds see *Liliums* or *Lily*. This beautiful species of lily is so called from the shape of its flowers, which are pendulous, or hanging in the manner of a bell, the petals being reflexed or turned backward and upward until the tips nearly touch the base of the flower. The flower spikes are long, often numbering as many as twenty blossoms of a purplish pink in colour spotted with dark purple. The leaves grow in whorls round the stem.

MARVEL OF PERU.

A genus containing about ten or a dozen species of greenhouse and hardy perennials

of which the best known is *Mirabilis Jalapa*, or Common Marvel of Peru, from whose tuberous roots the purgative jalap is prepared. The flowers are various in colour, being yellow, crimson, or white, or one or other of these colours striped or spotted with another. It will grow best in a light rich loam, but does well in any good well-drained garden soil. The roots are taken up and stored by nurserymen for sale in spring. It can be grown from seeds sown in gentle heat at the end of March or beginning of April and planted out in May.

MATHIOLA.

It is to this genus that all the flowers known as Stocks belong, and for the general culture of these pretty and sweet-scented flowers the reader is referred to *Stocks*, which see. The genus is mentioned here for the purpose of calling attention to *Mathiola odoratissima*, otherwise known as the Night Scented Stock, a small green-



MARTAGON LILY.

house shrub, which is reared in this country as an annual, being raised from seed in gentle heat and planted out in May. It is a very ordinary looking plant, insignificant flowers of a dingy

colour, changing ultimately to purplish brown, scentless by day, but exhaling a delicious perfume when the evening comes.



COMMON MARVEL OF PERU.

MAURANDYA.
A genus comprising six or seven species of a beautiful but delicately fashioned and somewhat tender greenhouse climber, of which the best known is *Maurandya Barclayana*. This and other species, notably *M. erubescens*, with rose-coloured flowers on a whitish tube, and *M. scandens*, with purple-violet flowers, will grow in the open



BLOOMS OF VARIETIES OF MAURANDYA.

ground, if planted in a warm and sheltered position. The flowers of *M. Barclayana* are of a violet-purple colour with a greenish

tube. They are raised from seed sown on a mild hotbed in gentle heat at the end of March, to be removed to the quarters in which they are to flower at the end of May or beginning of June.

ESEMTRYAN'THEMUM.

A brilliant and profuse-flowering tribe of extremely pretty, dwarf-growing shrubby plants, from the Cape of Good Hope, striking effective in beds, edgings, rock-work, rustic baskets, or vases in warm, sunny situations; also for in-door decoration, grown in pots, pans, or boxes. They succeed best in a dry, loamy soil, and are easily propagated by cuttings or slips



MESEMBRYANTHEMUM.

with a heel to them. Plenty of lime or mortar rubbish, road grits, and well-rotted manure should be mixed with the soil in which they are grown. The varieties are very numerous. The plant is also known as the Fig Marigold. It has thick, fleshy leaves, and, being a succulent plant, requires but little water.

MIGNONETTE.

A well-known fragrant favourite, which forms a pleasing contrast to the more showy occupants of the flower border. If well thinned out immediately the plants are large enough, they will grow stronger, and produce larger racemes of bloom. The seed should be scattered about shrub-

MIMULUS—MISTLETOE.

heries and mixed flower borders, where it grows readily. There are many varieties of mignonette, whose names may be ascertained from any seedsman's list. The



MIGNONETTE.

"Giant" mignonette is, perhaps, the most recent introduction.

A genus of extremely handsome profuse-flowering perennial plants, with singularly shaped and brilliantly coloured flowers, which are distinguished by their rich and strikingly beautiful markings. Seed sown



in spring makes fine bedding plants for summer blooming, and seed sown in autumn produces very effective early-flowering plants for greenhouse decoration, &c.

The best known of these plants is *Mimulus moschatus*, the Common Musk, which is a universal favourite. *M. luteus*, with yellow blossoms marked with dark blotches, is the variety known as the Monkey Flower. *M. Cardinalis*, with its red blossoms of peculiar form and its varieties, is a very handsome perennial, and looks well in juxtaposition with *Salvia patens*, which has brilliant, azure-blue flowers.

MISTLETOE.

To many persons the cultivation of the mistletoe is looked upon with as much doubt as we are told the ancient Romans



MIMULUS MOSCHATUS, OR MUSK.

looked upon the cultivation of mushrooms. It may, however, be very readily cultivated by attending to the following directions:— Make an incision in the bark of an apple-tree—many other trees, as the pear, oak, white-thorn, and even laurels, will answer equally well—and into this incision, in the spring of the year, insert some well-ripened berries of the mistletoe, carefully tying the bark over with a piece of bass, mat, or woollen yarn. This experiment often fails, from the birds running away with the berries from the place where they have been inserted, for they are very fond of them. To prevent this, the incision in the bark should be made on the underside of a

hanging branch, where birds are not likely to rest.

MONEY WORT. *See* Nummularia.

One of the names by which the pretty basket-plant *Lysimachia nummularia*, or Creeping Jenny, is also known.

MOSS ROSE. *See* Rose, Moss.

MYRTLE.

A most desirable shrub for the greenhouse or conservatory, being an evergreen with dark glossy green ovate or lanceolate leaves and bearing a pretty white blossom. It is sufficiently hardy to grow and thrive out of doors, especially in the south of Devon and to the westward in Cornwall and the Scilly Isles. It requires plenty of water, and, when grown under glass, the leaves should be

glass. There are many species, but the best known is *Myrtus communis*, the Common Myrtle, of which there are two well-known varieties, one with small narrow



POET'S NARCISSUS—DOUBLE VARIETY.

leaves, and the other with larger and broader leaves. The leaves exhale a fragrant odour, especially when crushed.

NARCIS'SUS.

This genus is a very extensive one, embracing Jonquils (*Narcissus Jonquilla*) double and single, the Polyanthus Narcissus (*N. Tazetta*) in its numerous varieties, the Hooped Petticoat (*N. bulborodium*), the Poet's Narcissus (*N. poeticus*), and many others. The Double Roman Narcissus (*N. Tazetta Romanus*), planted early in September, will bloom indoors before Christmas, while the Paper White (*N. T. papyraceus*), combined with the other varieties for indoor culture, if planted in succession from the 1st September to the 31st December, will maintain a rich floral display till the end of April.

Culture indoors.—This is similar to that recommended for the hyacinth. The bulbs of the Polyanthus Narcissus being large, a 5-inch pot will be needed for one bulb, and a 6-inch pot for three; a group of six in an 8-inch pot will produce an exceedingly beautiful effect.



MYRTLE (*MYRTUS COMMUNIS*).

frequently syringed. It is propagated by means of cuttings, which readily take root when placed in light loamy soil, mixed with sand and leaf mould and put under

NASTURTIUM—NEMOPHILA.

Culture out of doors.—This is exactly the same as that for the hyacinth, except that the crown of the bulb should be at least 5 inches under the surface, and for winter



DWARF NASTURTIUM—"TOM THUMB" VARIETY.
protection should be covered with about 1 inch of newly dropped leaves, or 3 inches of cocoa-fibre.

NASTURTIUM.

The nasturtium proper belongs to an altogether different order, namely, the *Crucifera*, and includes the watercress; but the name is so generally applied, though wrongly, to the varieties of *Tropaeolum*.



CLIMBING NASTURTIUM.

grown in gardens, that the error is continued here in the interest of the readers. Many are well known as climbers that will quickly cover any fence or trellis,

and exhibit flowers of every colour, from the palest straw colour through orange and red to the deepest velvety brown. The dwarf improved varieties of nasturtium are amongst the most useful of garden flowers for bedding, massing, or ribboning, and may be said to take rank with the geranium, verbena, and calceolaria; their close, compact growth, rich-coloured flowers, and the freedom with which they bloom, all combining to place them among first-class bedding plants. The scarlet, yellow, and spotted Tom Thumb are distinguished favourites, as are also many others, whose names will be found in the price lists of the



NEMOPHILA MACULATA.

seedsmen. The seeds when green are often used in pickling, affording an agreeable pungent addition to the contents of the pickle-jar. Some, too, use them as a substitute for capers.

NEMOPHILA.

This is perhaps the most charming and generally useful genus of dwarf-growing hardy annuals. All the varieties have a neat, compact, and uniform habit of growth, with shades and colours the most strikingly beautiful, so that ribboned, sown in circles, or arranged in any style which the fancy may suggest, the effect is pleasing and very striking. *Nemophila insignis*, sky blue with white eye, *N. maculata*, with white flowers blotched with purple at the apex of the

petal, and *N. phaceloides*, also blue with a white eye, are very distinct varieties; the last-named is a beautiful hardy perennial, and the second is more robust in growth, and has larger flowers than the other varieties. There are many varieties of the first. They all grow well from cuttings and seeds.

NERINE SARNIENSIS. See Guernsey Lily.

NE'RIMUM.

The best known of this class is *Nerium oleander*, the Common Oleander, which usually requires a greenhouse in England, but which flowers beautifully out of doors in Southern Europe. There are many varieties, but the best known are confined to two, which bear the one a pink and the other a white flower, slightly double. All the oleanders require a mixture of equal parts of peat, loam, and sand. They are very subject to brown scale, and the tough lanceolate leaves, which grow in a whorl, three in number, frequently require sponging. The blossoms and even the wood of the oleander are poisonous. The plants require plenty of water, which should only be withheld for a short time after they have done flowering. The best way of propagating the oleander is to place cuttings of well-ripened shoots in bottles of water, hung up where the sun's rays may fall on them. The cuttings throw out roots in the water, and when sufficiently well rooted they must be potted in light soil.

NICOTIANA.

A genus of plants under which are placed all species of tobacco plants. The sort grown in our gardens and greenhouses is *Nicotiana affinis*, a plant with blossoms tubular in shape and terminating in five pointed segments turning outwards from the tube. The blossoms are of a greenish

hue on the exterior, and exhale a delicious odour in the evening. The plants are raised from seeds sown in gentle heat early in the year, say in February, and may be placed out in the open ground in June, or potted for the decoration and perfume of the greenhouse or conservatory. Although treated as annuals, they are perennials; and after they are cut off by the first frost, if the roots remaining in the ground are protected by a covering of ashes, they will come up again year after year. There



TYPE OF NICOTIANA.

could not be a better plant for the adornment of the conservatory.

NOISETTE ROSES. See Roses, Noisette.

NUMMULARIA:

This pretty trailing plant, which is suitable alike for rock-work, baskets, embellishment of the conservatory and greenhouse, and for window gardening, is called *Nummularia* from the supposed resemblance of its long strings of golden-yellow flowers to rows of gold corn, hence its common name of Moneywort. It is also familiarly known as Creeping Jenny. Propagate by division of the roots when flowering has ceased, or by offsets, detached

from parent plant, with rootlets springing from them, or by cutting taken in summer. It will grow in any ordinary soil.

NUPHAR.

A genus numbering but a few species, among which is *Nuphar luteum*, the Yellow Water Lily. This lily is perfectly hardy, and, like all of its kind, may be grown with success either in a pond or a slow stream. In planting it is best to plunge the root in a small hamper or basket, not too closely put together, in good soil, and then sink



it in the spot where it is desired that the lilies should grow. The roots thus fixed will be secure and will



NUPHAR LUTEUM, OR YELLOW WATER LILY.

soon find their way outside the receptacle and make fresh growth around it. Other species are *N. advena* and *N. Kalmiana* or *rumicium*, which also have yellow flowers.

NYMPHAE'A.

This is another genus of water-lilies, whose species may be grown and managed in the same way as *Nuphar luteum*. The hardy out-door species have white flowers, and among them is the Common White Water Lily indigenous to Britain. Those from hot countries, which are very beautiful, require a hothouse in this country. They vary in colour, being white, blue, pink, yellow, and scarlet.

ŒNOTh'ERA.

A genus of most useful and beautiful plants, for beds, borders, edgings, or rock-work. All the species are free-flowering,



WHITE WATER LILY.

and most of them perennials. The most remarkable of the perennial kinds are *Œnothera Lamarckiana*, *Œ. macrocarpa*, *Œ. taraxacifolia alba*, *Œ. macrantha grandiflora*, *Œ. biennis*, and *Œ. prostrata*. Most of these, if sown early, flower the first year. Of the annual varieties the best are *Œ. Drummondiniana*, *Œ. bistorta*



ŒNOThERA LAMARCKIANA.

i, and *Œ. rosea*. They all succeed in any good rich soil, and grow well from

OLEANDER. See *Nerium*.

OPUNTIA.

This is the general name of a genus of greenhouse evergreen succulents, of which there are many species, including *Opuntia ficus Indica*, otherwise known as the Indian



ORNITHOGALUM.

Fig. They are ornamental and interesting greenhouse shrubs, with edible fruit, and succeed best in sandy loam with an equal quantity of peat, and plenty of cow dung, lime rubbish, and charcoal mixed with it.

ORNITHOGALUM.

The plants of this extensive genus are properly divided into two classes, namely *Epiphytes*, or orchids which grow on trees, and *Terrestrial*, or those which grow on the ground. They may, however, be regarded as forming four groups, namely, orchids from the tropics, which require a stove; orchids from the Cape of Good Hope, which are suited to a greenhouse; those from the south of Europe, which need only a slight protection during winter; and our own native varieties. Terrestrial orchids are grown in pots in ordinary soil, and in some cases like a stiff loam, in which pot plants, generally speaking, would not thrive. The drainage, in most cases, for orchids should be complete, and in the case of terrestrial orchids the soil will vary according to the requirements of the individual, from a stiff soil, as already mentioned, to a compost consisting of equal parts of fibrous peat and sphagnum,

with a little sharp sand and crushed charcoal.

Of the terrestrial orchids the Cypridiums, perhaps, are the most hardy, and require the least care in cultivation, as they may be potted in the ordinary way in peaty soil, well drained. They require abundance of water, especially when in flower.

ORNITHOGALUM.

The plants belonging to this genus are numerous, and consist of various bulbous-rooted species bearing, for the most part, white or yellow star-like flowers, from which the popular name of "Star of Bethlehem" has been given to Some are hardy and fitted for the open border; others are half-hardy, and better suited for greenhouse culture. They thrive in any rich light garden soil.

OXALIS.

A genus of exceedingly pretty bulbous plants, all of which have beautiful green foliage, which forms a fine contrast to their richly coloured blossoms. They are admirably adapted for pots, borders, and rock-work, succeeding in any light soil.



OXALIS.

Oxalis acetosella, otherwise known as the Common Wood Sorrel, may be named as an example. *O. floribunda*, of which an illustration is given, is a pretty garden plant bearing rose-coloured blossoms.

For late spring or early summer flowering few plants are more useful than peonies, which are divided into two classes, shrubby and herbaceous. Every flower garden



PÆONY.

should have some of them. They are mostly very hardy, and in colour vary from pure white, blush, salmon, and rose, to the most intense crimson. The Chinese tree, or shrubby, varieties (*Peonia Moutan*) are also hardy and early flowering. Bedded upon lawns they have a beautiful effect. In a shrub-like form they rise from 3 to 5 feet in height, and branch out in a good rich soil to 10 or 18 feet in circumference. There are many varieties, and the colouring is extremely rich. They are most of them profuse flowerers.

PANSIES. See Heartsease.

PASSION-FLOWER.

The Passion-flowers form a genus of magnificent ornamental twining shrubs, with flowers at once interesting, beautiful, and curious, which are produced in the greatest profusion and in succession during the greater part of the year under glass, and out of doors during summer and autumn. They are among the most im-

portant and effective of plants for training in conservatories, or covering the fronts of cottages and villas in the town or country.

They are propagated by means of young shoots taken from the parent plant with a heel, set in light sandy soil in small pots, and placed in a close frame or under a handlight. They will grow in almost any kind of soil, provided that the drainage, when in pots, is efficient. For outdoor culture *Passiflora caerulea*, or the blue passion-flower, is the most hardy, and therefore the most suitable. For indoor decoration of the conservatory and greenhouse, the white variety known as "Constance Elliott," and *P. coccinea*, with its beautiful red blossoms, are very desirable. Some of the varieties bear edible fruit.

PELARGONIUMS, CULTURE OF.

June and July are the best months for increasing pelargoniums for ordinary



SHOW PELARGONIUMS

purposes. Cuttings struck at this season from plants which have been forced, and the wood thoroughly ripened, produce fine plants for autumn flowering and early spring forcing, supplying the want of

flowers in the conservatory in winter and spring. The pots being prepared in the usual manner, and well supplied with drainage and other loose material for one-third of their depth fill up with a compost



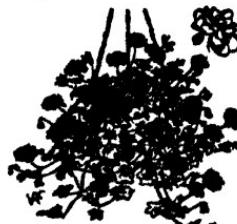
PELARGONIUMS.

composed of equal parts turfy loam and silver sand well mixed and sifted, so as to keep back the large lumps. Select cuttings from strong short-jointed shoots three or four inches long, removing the lower leaves so as to leave the base of the cuttings clear; place them round the edge of the pot about an inch or an inch and a half deep. When planted, water freely to settle the soil round them, and place them in a cold pit or frame. Sprinkle them occasionally overhead till rooted; afterwards give air gradually to harden them for potting off into 3-inch pots.

When well established in the small pots and about six inches high, stop them, that they may throw out lateral or side shoots. When they have made their shoots, repot them in 48's, in equal parts turfy loam, peat, and decomposed cow or stable dung, with a good proportion of road or river sand, the pots being thoroughly drained with potsherds or oyster-shells; thin out the leaves and small shoots occasionally,

to throw the whole sap into the shoots which are to produce flowers. When plunged into the border to flower, these plants will be benefited by being lifted occasionally to prevent them from rooting through the bottom of the pots. Those for spring forcing will require a further shift in September; and the fancy varieties, being more delicate growers, will require more drainage; and a little charred cow dung in rough pieces over the potsherds will be found beneficial.

Fancy Sorts for Specimens.—When autumn-flowering plants are required, take cuttings in early summer, when they will strike freely; fill the pot half full of broken potsherds, then add a compost of equal parts of good turfy loam, peat, and well-decomposed cow dung and leaf mould, with a good portion of silver-sand. By the end of July the plants will require to be reported: take care that this is repeated as often as roots fill the pots. As the season advances, a little heat will make them expand their blossoms more freely. For large fine-grown specimens select a strong plant, and pot in a compost consisting of two parts good turfy loam, one of leaf mould, one of well-decomposed cow dung, and a good portion of silver sand. After a



IVY PELARGONIUMS.

summer's free growth, assisted by frequent watering, about the beginning of July begin to diminish the quantity of water, so that the wood may be thoroughly hardened before cutting down. By the end of July

the plants should be shaken clean out of the soil, the roots pruned at the points, and repotted in a similar compost. In November they should be potted again; and in February they will require another shift, when each shoot should be stopped at the fourth joint, to induce lateral shoots. When these laterals are of sufficient length, they must be stopped again. If intended to flower in May, stop in July; if in June, stop in January; and if in July, stop in February.

Pelargoniums are classified as—(1) Show and Decorative; (2) Fancy; (3) Zonal,



PENSTEMONS.

or Bedding; (4) Variegated-leaved; (5) Ivy-leaved. The named varieties are far too numerous to admit of mention of them here.

PENNYROYAL.

A variety of mint (*Mentha pulegium*) cultivated chiefly as a medicinal herb, although it is sometimes used in cookery. It is propagated by division of the roots in spring or autumn. It thrives in good loam or good garden soil, and, if the soil be dry, it requires watering, as it does best in a moist situation.

PENSTEMON.

Useful herbaceous perennials for the garden, bearing flowers of various colours, and of graceful habit of growth. They are propagated by seeds or cuttings and do best in well-manured sandy loam. Although hardy, young plants require protection in frames during the winter, and even well-established plants are susceptible to injury from wet weather, speedily followed by sharp frost. It is better to cover the roots with ashes during the cold season.

PERENNIALS.

Plants which do not require renewal from seed from year to year are called perennials. There are two sorts, namely, those which are not always visible above ground, but die down to the ground every year, and spring up again the year following; and those which do not die down, but retain their leaves, as pinks, carnations, saxifrages; and these, on this account, are called evergreen perennials. The first sort are known as Herbaceous Perennials.

PERENNIALS, HERBACEOUS. See
Herbaceous Perennials.

PERIWINKLE. See *Vinca*.

PETUNIA.

There is very little difficulty in the culture of this half-hardy, soft-wooded plant, which may be propagated from seeds sown in the spring, and treated in precisely the same manner as that prescribed for raising half-hardy annuals, or it may be grown from cuttings struck in gentle heat in early spring, or without heat in August and September. Both single and double varieties are beautiful in appearance, and may be used for borders, bedding-out purposes, and pot culture.

Propagation by Seeds.—The seeds should

be sown in light sandy soil that is fairly rich, and sprinkled over with a slight covering of the same mould when sown. When large enough to transplant, shift from the pot or seed pan in which they



have been raised into smaller pots; 3-inch pots will do, although even smaller sizes may be used, and in these they may remain until they are required for planting out. If they remain in pots for some little time before they are planted out, they should be pinched in order to induce shrubby habit of growth.

Propagation by Cuttings.—Cuttings taken in August and planted in a south border, in soil with which some sand and rotten manure from a spent hotbed have been incorporated will soon root and be ready for transfer to pots at the end of September. They should be wintered in a pit or cold frame, round which sufficient litter should be placed, with mats, &c., or other suitable means of protection over the glass, to keep out the frost. When in this position and condition, they will need but little water, for they should be kept as dry as possible, having due regard to the sustention of their vitality. Air should be given when the weather is fine and dry; if any signs of mildew show themselves, they should be dusted with sulphur. Old plants should be subjected to the same treatment to preserve them through the winter. If started in February in gentle heat, they will soon send out

shoots which may be taken off and struck in seed pans, well drained and filled with light sandy soil, in warm bottom heat. The soil in which the cuttings are placed should be kept moist.

Soil, &c.—For a useful compost for petunias, use six parts of rich fibrous loam, two parts of leaf mould, one part of decomposed cow manure, and one part of sharp sand. Incorporate all well together, and let the compost lay by for some weeks before using. Petunias that remain in pots should be shifted in the spring into 6-inch pots, in which they will bloom. Liquid manure may be given when they are about to come into blossom.

PHILADELPHUS. See Syringa.

PHILLYREA.

Of *Phillyreas* there are several sorts, all of which, from their dark, shiny leaves, form excellent masses, and grow freely in almost any soil. All plants belonging to this genus are white-flowered, but the beauty of each variety lies in its leaves and not in the bloom, which is small in



DOUBLE PETUNIA.

every case, and by no means showy attractive.

PHLOX.

This magnificent genus of plants, both annual and perennial, is unrivalled for rich-

ness and brilliancy of the colours of the flowers, and profusion and duration of blooming. The *Phlox Drummondii* varieties — half-hardy annuals — make splendid bedding and pot plants; the *P.*



PHLOX DRUMMONDII.

decussata or *maculata*, perennial varieties, produce a fine effect in mixed borders; no garden should be without them. They succeed best in light rich soil, and are propagated by seeds in the case of annuals, and by cuttings and division of the roots for perennials.

PICOTEEES.

These are a kind of carnation, distinguished by a narrow dark-coloured edging to the petals, or by the petals, being covered with very small coloured dots. The cultivation is in every respect the same as the carnation.

PINKS.

Pinks are closely allied to picotees and carnations, and admit of very similar cultivation. New varieties may be obtained from seed, and old plants may be increased by pipings.

Pipings, as the grass is called when it is pulled out of the joint in the parent stem, should be struck under a handglass, and when well rooted should be planted in a bed, in rows 6 inches apart, and 3 inches between the plants: here they should remain till September, when they may be planted in a bed or pots, in a compost, con-

sisting of two-thirds of loam from decayed turf, and one-third well-decomposed cow dung. If in pots, let them be 48's, having a few crocks in the bottom, and filled with compost. Lift the plants carefully, without breaking the fibres, adjusting the soil so as to place the plant in its proper position, spreading out the roots on the soil, and filling up the pot to the surface. The roots must not be sunk too deep, but the soil on the top must be on a level with the collar of the plant. When gently watered, the pots may be placed in a common garden frame, and the glass closed for four-and-twenty hours. Throughout winter the plants give very little trouble, seldom requiring water, but all the air which can be given them. In March they should be repotted in the pots in which they are to bloom, which should be 24's, with an inch at least of crocks for drainage; the soil as before.

The soil best suited to receive the young plants is a mixture of good hazel loam, with well-rotted manure from old cucumber or



PICOTEE.

melon frames. This mixture should be made some months before it is required for use, and at the time of planting or potting the layers a little white sea-sand should be added. Where layers of carnations and

tees are potted, the best plan appears to be to place them singly into small pots for the winter months. In this way they can be packed closely under common frames, in old tan or cinder-ashes. Let the newly potted layers have all the air possible in fine weather; but if the winter prove severe, it will be necessary to cover the glass with mats, straw, or pea-haulm.

Pink pipings properly rooted should be planted out in October; avoid the old system of shortening the grass. Where seed is required, the decaying petals should be picked off. See also *Carnation*.

PLUMBAGO.

A genus comprising eight or ten species of plants, mostly perennial, some fitted only for the greenhouse, and others hardy, with flowers, blue, pink, white, or purple in colour. The most noteworthy for greenhouse culture and decoration is *Plumbago Capensis*, an admirable pillar plant, capable of being trained to the rafters of a greenhouse. Its flowers are of a beautiful pale blue colour, and in form are very like those of the phlox. It thrives in a compost of rich fibrous loam, sand and peat, and is propagated by shoots from the base of the plant, which have rooted in the surrounding soil, or by cuttings, struck in fine loam and sand, in gentle bottom heat.

POLYANTHUS.

This flower is a primula, and is said to be derived from a cross between a cowslip and a primrose, partaking of the nature of the former in the number of its florets, and of the latter in their form. They are generally classified as gold laced, these having flowers with a brilliant yellow edge round the outer part of the petals; fancy; and hose-in-hose.

After flowering, divide the roots of the best plants intended for preservation. This operation must be performed every year,

or the flowers will soon degenerate. Fresh soil and continual division is the only plan with all florists' flowers which give out offsets. As the polyanthus seeds freely, an infinite variety may be obtained by those who will take the trouble to select or purchase seed and sow it. The seed should be sown late in the autumn, for moderate sunlight only is required to bring up the seed, and the young plants will not stand the scorching sun of summer. Sow in boxes, or pans well drained, filled with light rich mould. The seed must be very lightly covered—indeed, it may almost lie upon the surface. The boxes should be placed under glass, and sparingly watered. They require no artificial heat. When divided in the summer after flowering, the



POLYANTHUS

young plants should be removed to the reserve garden, and allowed to remain there until they are removed to their blooming quarters in late autumn or early spring.

POLYGONATUM.

The scientific name of a genus of pretty herbaceous perennials, of which the best known is *Polygonatum multiflorum*, commonly called Solomon's Seal. Its feather-like habit of growth, consisting of pairs of light green leaves, from bottom to top of a light bending stem, with pendulous, green and white, flowers springing and hanging from the axils of the leaves, renders it a highly ornamental and desirable border plant. It thrives in any good garden soil,

and will grow in the shade. It is propagated by division of the large fleshy roots.

POTENTILLA.

A genus of plants some of which bear a resemblance to the strawberry in flower



POTENTILLA.

and manner of propagation by runners, inasmuch that they are sometimes taken for wild strawberries. It must be understood that the resemblance is not general, but is confined to some species included in the genus, many being shrubby herbaceous perennials ranging from 1 foot to 3 feet in height. These are propagated by division of the roots and by seed. The flowers are chiefly white or yellow, but some species bear red or purple flowers. The dwarf kinds are well suited for rock-work. The Marsh Cinquefoil is a potentilla.

PRIM'ULA.

This genus is a very large one, including, as it does, some of the most popular florists' flowers, viz., the auricula, the polyanthus, and the primrose. It is not possible to do more here than call the reader's attention to the greenhouse varieties of *Primula Sinensis*, so useful for winter decorations. These begin to flower early in November, and, by care,

a succession may be kept up until spring is far advanced. For bouquets also they are almost invaluable. Mr. B. S. Williams, to whom the public are so much indebted for the care he has bestowed on these beautiful plants, says, "Taking them all in all, these are the most valuable winter-flowering plants in existence." His directions for sowing and culture are as follows:—"Sow in March, April, May, June, and July (with great care, for although so easily raised in the hands of some, it is nevertheless a great difficulty to others, who, in many instances, too hastily condemn the quality of the seed), in pots filled to within half an inch from the top with sifted leaf mould, or, what is better, with thoroughly rotted manure, which has been exposed to all weathers for a year or two. Leave the surface rather rough, and sprinkle the seed thinly upon it, not covering with soil. Tie a piece of paper over the top of the pot, and leave it in a warm house or hotbed. When the seed becomes dry, water the paper only; the seed will then germinate in two or three weeks. After this remove the paper and place in a shady place, potting off when sufficiently strong into small pots; place the pots near the glass in a



PRIMULA SINENSIS OR CHINESE PRIMROSE.

frame or greenhouse. One caution is necessary—never use peat mould or any soil liable to cake on the surface or turn green, as the loss of the seed is a certain consequence."

PYRETHRUM.

A genus of hardy herbaceous perennials, now included under "Chrysanthemum," which is the most beautiful species of the , and contains the greatest number of



PYRETHRUM ROSEUM.

varieties. The term is usually applied to plants of the "Bachelor Button" kind. The most noteworthy one, *Pyrethrum roseum*, having rose-coloured flowers, or rather petals of this colour arranged round a yellow disc, and *P. uliginosum*, or the "Great Ox-eye Daisy." The flowers, white, yellow, and blue, popularly known as Marguerites are allied to the pyrethrums. Propagated by division of the roots, cuttings, and seeds.

QUAKING GRASS.

This curious plant should find a place among the ornamental grasses. It is easily dried, and in this state becomes useful for winter decorations. There are several varieties, all hardy annuals, growing freely from seed. *Briza major*, the large quaking grass, is the favourite.

RANUNCULUS.

The varieties of this flower at the present time are confined to two, namely, the Turban Ranunculus and the Persian Ra-

There

are classes of the ranunculus known as "English," "Scotch," and "French," but these are merely improvements of the types already mentioned, the last named being a robust variety of the Turban type which has gone back to a semi-double condition, making amends for its retrocession from the close and compact blooms of the Turbans, by increased abundance of flowers and more vigorous growth and habit. The colours of the ranunculus are as numerous as they are beautiful, being in all shades of purple, brown, crimson, scarlet, rose, pink, and yellow, and in black and white, some having the blooms variegated with markings and edgings of another colour.

Planting, Soil, &c.—The tubers may be planted from October to the end of March, some preferring one period and some another : perhaps no better time could be chosen for planting than the beginning or middle of February. As soon as the beds are in a fit state, lose no time in planting, if the weather be favourable ; waiting a



GREAT QUAKING GRASS.

day, or even a week, is nothing in comparison with placing the roots in soil in an unfit state to receive them. They are best cultivated in 4-feet beds of rich loam mixed with one-fourth part of decomposed cow

dung. The soil should be dug from 2 to $2\frac{1}{2}$ feet deep, and if the situation is moist and partly sheltered, so much the better. A constant supply of moisture is essential to their beauty and growth, although an



PERSIAN RANUNCULUS—SEMI-DOUBLE VARIETY.

excess of water would destroy the tubers during the cold of winter and early spring : after their blossom-buds are formed, however, the surface of the beds must never be allowed to become dry ; a daily soaking of water will then be necessary in dry weather, not only for the sake of the flowers, but to preserve the roots from injury, these being very near the surface. The roots should be planted about 2 inches deep and 6 inches apart ; their clawlike extremities should be pressed firmly into the earth, and the crowns be covered with an inch of sand previous to another inch of soil being spread over them ; the beds may then be covered with a layer of spruce branches, straw litter, or leaf mould, to protect them from the frost : this will, of course, be removed before the appearance of the plants above ground.

Propagation by Offsets.—Ranunculus are increased by offsets, dividing the tubers, and seed. Offsets is the usual mode of increase, and they are generally sufficiently strong to flower the first year.

Choice sorts may also be divided into several plants ; every little knot that appears on the top of a tuber will form a plant if carefully divided, so as to insure an accompanying claw. Unless, however, for choice sorts, this mode of increase is not desirable : by seed is the most rapid mode of increase, as well as the only way of securing new varieties. It is said by some persons that ranunculus never come true from seed, so that variety is certain.

Storing Tuber.—Generally ranunculus will have died down, and be fit for taking up and storing, by the end of June or beginning of July. The place for storing should be dry ; a drawer with a bed of sand being the most convenient.

RHODANTHE.

These half-hardy annuals, which are now called *Helipterum*, though they are still, perhaps, better known under the old name, are everlasting of great beauty ; valuable alike for the decoration of the conservatory and flower garden. Their neat compact growth renders them suitable for flower beds and ribbons, while their rich-coloured



RHODANTHE MANGLESII.

flowers, elegant habit of growth, and profuse blooming, make them objects of universal admiration : the flowers, if gathered when young, are valuable for winter bouquets. Succeed best in a light rich soil and

warm, sheltered situation. The best known is *Rhodanthe* or *Helipterum Manglesii*, bright rose, with silvery calyx, one foot.

RHODODENDRONS.

Of late years rhododendrons have so greatly increased and multiplied, and have improved so rapidly by crossing, that they are now, without exception, the most magnificent of all our hardy shrubs. They are also so cheap as to be brought within the reach of all, and yet many fine specimens are so valuable as to continue the luxuries of the rich. They vary in price from 15s. a hundred to 15 guineas a plant. Nothing equals the common *Rhododendron Ponticum* for underwood in plantations, or furnishing cover for game. There are about eighteen or twenty varieties of this class alone, including almost every shade of colour. The splendid *R. Catawbiense* variety has been almost equally fruitful in hybrids, and presents its formidable list of *R. C. albums*, *R. C. roseum*, *R. C. purpureum*, *R. C. splendens*, &c.

Amidst hosts of other hardy hybrids, those from *R. arboreum* are as good as any. All rhododendrons require bog soil or peat. They bear frequent removal; but care must always be taken not to break the ball of earth or loosen the soil from the stem.

RIBBON-PLANTING.

The ribbon style in border-planting is very effective. As an illustration of it take the following arrangement: Supposing there be room for five or six rows, each row a foot or 18 inches wide—a double row of *Lobelia speciosa* next the edging, followed by a row of verbenas—any white sort; these, again, followed by *Calceolaria aurea*, this by Tom Thumb, or some similar dwarf scarlet geranium. If there be room for more rows, the above may be followed by *Salvia patens* (blue), *Coreopsis lanceolata* (yellow), a row of white phlox, and a back

row of dahlias. These should graduate in height and colour. This is merely given as a sample of what may be done. There are many plants that may be used in the same way, as *Kenigia variegata*, *isotomas*, *Phlox Drummondii*, which are all dwarf, and suitable for front row; petunias, heliotropes, lantanas, &c., might form a second; ageratum, galardias, salvias, a third. Again, *Mirabilis*, or Marvel of Peru, still taller; and then dahlias and hollyhocks, tallest of all.

RIBES.

A genus of pretty shrubs akin to the currant and gooseberry, hardy, deciduous perennials, bearing red, white, yellow, and



RICINUS.

green florets, clustered together in racemes. They are easily propagated by means of layers and cuttings, and thrive in any ordinary garden soil. They are treated in the same way as gooseberries and currants, and are subject to the same pests. *Ribes sanguineum*, or the flowering currant, with pendant racemes of pink flowers, sometimes deepening to light crimson, and *R. Grossularia*, or the flowering gooseberry, with greenish yellow flowers, are the best-known varieties, and most used as garden

RICINUS.

A magnificent and highly ornamental genus of half-hardy annuals, whose picturesque foliage and stately growth (6 to 10

feet in height), combined with the brilliant coloured fruit of the Giant varieties, impart to select plantations, shrubbery, and flower borders, quite an oriental aspect. The *Ricinus* is better known to most people as the "Castor-oil Plant." They succeed best in rich soil, and are generally propagated by seed.

ROCKET.

Very pleasing early-spring-flowering hardy annuals, biennials, and perennials, with deliciously fragrant flowers; grow freely in any soil. The flowers of the rocket (*Hesperis*) are mostly purple or white in colour. Propagation is effected by seeds



ROCKET.

in the case of annuals, and by division of the roots for perennials.

ROSE, AYRSHIRE.

The rapidity with which this rose covers a wall or pillar, added to its intrinsic beauty, renders it invaluable to the gardener. Where its growth is encouraged, it climbs to the summit of the tallest trees, from which its long graceful shoots hang in festoons.

The Ayrshire is the hardiest of climbing roses, and its cultivation and management is very simple. Layers of its long pendulous shoots root readily, and it strikes easily from cuttings; it will grow rapidly where other roses will scarcely exist,

and when placed in good rich soil, its growth is so rapid that a large space is covered by it in the second season of planting. It forms an admirable weeping rose when trained on wires. It is useful for trellis, verandah, or alcove, as well as in rough places of the park or shrubbery. Its luxuriant growth soon turns a rough and dreary waste into a flowery bank.

Like the other roses, the Ayrshire has yielded many hybrid varieties:—

beautiful pendulous tree as a half-standard.
Dundee Rambler,—white, edged with pink; well-adapted for a half-standard for the lawn.

Ruga,—pale flesh colour; very fragrant; hybrid between Ayrshire and a tea-scented rose.
Splendens,—creamy white, approaching flesh-colour when full; crimson in the bud; large, double, and globular; one of the finest pendulous roses.

Queen of the Belgians,—creamy white; cupped, large and double; very sweet-scented.
Alice Grey,—creamy salmon-blush.
Countess Lieven,—creamy white; cupped and double; of medium size.

ROSE, BOURBON.

These bloom more freely in the autumn than even the hybrid perpetuals, and most of them are quite hardy even in the extreme North of England. They are deficient generally in shape and fragrance, but brilliant in colour. They are extremely well adapted for planting in large masses, as half standards or dwarfs, or for furnishing complete beds of one colour. Several of these, such as Souvenir de Malmaison, Catherine Guillot, &c., have also a good form. Souvenir de Malmaison, a large, bright, flesh-coloured flower, is exquisite in bud, and one of the very best roses grown.

The distinguishing characteristics of Bourbon roses are brilliancy and clearness of colour, large and smooth petals, falling in numerous and graceful folds. They are perfectly hardy, and thrive under the ordinary culture, delighting in a rich soil.

like most of the roses, and requiring close pruning, except the more vigorous kinds. They are of slow growth, however, in spring, and thus they are best adapted for autumn-flowering roses.

The following are good Bourbon roses:—

Acidalie,—blush-white, large and globular, does not expand well on some soils.

Armoss,—very free bloomer, pink.

Baron Gonella,—deep rose, approaching cherry colour, shaded with rosy bronze, bloom large and very double.

Catherine Guillot,—carmine rose, bloom large, well formed, and full.

Emotion,—delicate rose, free bloomer, flowers of excellent form, cupped and double.

Jules Jurgenson,—deep velvety carmine rose, with slaty reflex in centre, large and well formed.

Louis Margottin,—very pale rose, hardy, and of robust habit, flowers beautifully formed.

Madame Isaac Pereire,—glowing carmine, large and perfect bloom, vigorous habit, and hardy.

Malmaison Rouge (sport of *Souvenir de Malmaison*),—deep velvety red.

Queen of Bedders,—deep crimson, free and continuous bloomer, good for bedding.

Queen of the Bourbons,—fawn, shaded with rose, most abundant bloomer, beautiful in bud, and highly fragrant.

Rev. H. Dombrain,—fine dark crimson, medium size, good for potting.

Setina,—silvery pink, of fine form, from United States, profuse bloomer, climbing habit.

Sir Joseph Paxton,—brilliant rose, shaded-crimson, robust grower.

Souvenir de Malmaison,—flesh, very large and full, a charming rose.

ROSE, BOURSAULT.

These are cultivated varieties of the Alpine rose; the shoots are very long, flexible, and smooth, in many instances entirely without spines, and the eyes are further apart than in most other kinds. The flowers are produced in clusters suitable for pillars, and from their naturally pendulous habit they may be trained to form weeping roses. They should be well thinned out in pruning, but flowering-shoots should only have the points cut off. Mr. Paul describes the following as blooming from May to July:—

Amadis,—deep crimson-purple, shaded with lighter crimson; large, semi-double, and cupped; the young wood whitish-green.

Banksia,—flowers pink; a very early bloomer.

Black Boursault,—flowers whitish-blush, with

deep flesh centre; very double and globular; of pendulous habit; excellent as a climbing rose in a good aspect.

Drummond's Thornless,—opens a rosy carmine, changing to pink; flowers large, double, and cupped; habit pendulous.

Elegans,—flowers in clusters of semi-double rosy crimson; sometimes purplish, often streaked with white; erect in habit, and suitable for a pillar.

Gracilis,—flowers early; cherry, shaded with lilac-blush; full-formed and cupped; of branching habit; spines long and large; foliage a rich dark-green.

Inermis,—rosy-pink, becoming pale when expanded; large and double, and of branching habit; shoots spineless.

Old Red Boursault,—opens a bright cherry, becoming paler gradually; large and semi double; of pendulous habit; a showy pillar or weeping rose.

Weeping Boursault,—flesh-colour, like the blush; of a pendulous habit, and suitable for a weeping rose.

ROSES, CHINA.

The common and crimson China roses are very beautiful, grown either in beds or on walls. Several other China roses are useful and effective for the flower garden. The best of them are, perhaps, the following:—

Abbe Mioland,—purplish crimson, shaded.

Alfred Aubert,—bright red, growth vigorous, free bloomer.

Archduke Charles,—rose, changing to crimson, very large and full.

Clara Sylvain,—pure white, large.

Cramoisie Supérieure,—bright crimson.

Duchess,—pure white, medium size, but of excellent form, free bloomer.

Fabvier,—beautiful scarlet crimson.

Mrs. Bonanquet,—pale, delicate flesh, free bloomer.

Old Blush,—very free-flowering. This is the original China rose.

Old Crimson,—old bright crimson of a dark shade, free grower.

The whole of the China roses require some protection in winter. Nothing is better than some coal ashes over the roots, say 8 inches thick, and a quantity of boughs of spruce, &c., bent over the tops, from 6 to 8 inches in thickness.

ROSES, CLASSIFICATION OF.

Taking height only into consideration, worked roses—that is to say, roses budded on stems or stocks—are distinguished as Standards, Half Standards, Dwarf Stan-

dards, and Dwarfs. Of these, *Standards* are on stems from $2\frac{1}{2}$ feet to 4 feet from the ground to the budding; *Half Standards*, from $1\frac{1}{2}$ feet to $2\frac{1}{2}$ feet; *Dwarf Standards*, from 1 foot to $1\frac{1}{2}$ feet; while *Dwarfs* are worked close to or beneath the surface, and form vigorous bushes for winter planting. *Dwarfs* on own roots are small plants in pots, which should be planted out in early autumn, or kept in frames during the winter and put out in April. In addition to these forms there are *Climbing* Roses, whose habit is obvious from the name they bear. Further, roses generally are divided into two great classes or sections, namely, Summer Roses and Autumnal Roses.

ROSES, GRAFTING.

This operation is performed by cutting the top of the stock to a proper height by a clean horizontal cut, and then make a longitudinal V-shaped cut down the centre, 1, 2, or 3 inches long, according to the size of the stock. In this slit place the graft, after having cut the lower end of it to fit the cut in the stock. Having inserted it, bind the whole up with clay or grafting paste, as directed in budding. The best time for grafting roses in pots is January.

ROSES, HYBRID PERPETUAL.

With regard to the management of this variety of rose, Messrs. Paul & Son, of the Old Nurseries, Cheshunt, say:—"The culture of all the Hybrid Perpetuals is one of the simplest and may be applied to all the other classes. The soil cannot be too rich or deeply cultivated; trenched ground with a thick layer of manure just above the forked-up bottom of the trench is desirable, and a fresh mulch of manure after planting, to be pricked in about March, will do good. The pruning in this class should be regulated by the growth of the individual varieties, the weak shoots being cut in close, the stronger sucker-like shoots being

left longer. The stronger grown form good pillar, pyramid, or climbing roses, and the shoots for these forms of growth should be left almost their entire length."

The following is a list of the best varieties of Hybrid Perpetual Roses for ordinary garden purposes, taken from Messrs. Paul & Son's catalogue:—

American Beauty,—deep rose, large globular flower, sweet scent.

Brightness of Cheshunt,*—very vivid brick red, approaching scarlet.

Capital,—bright red.

Charlotte,—shaded.

Comtesse de Berne,—bright rose, a kind of *Victor Verdier*.

Edouard Morren,*—deep cherry-carmine.

Garden Favourite,—flesh pink, free grower.

Gloire de Margotin,—bright red, good for buds.

Gloire Lyonnaise,—lemon, changing to lemon-white.

Jules Margotin,—bright cherry-red, free and good.

La Reine, brilliant glossy rose colour, shaded

Madame Cecile Brunner,—light rose; large bud.

Madame de la Segliere,—bright rosy-pink; free and distinct.

Madame de Trotter,*—cherry-red, shaded white.

Madame J. Gaulain,—bright rose, very distinct.

Madame Limousina,—striped form of *Madame Monet*; distinct.

Marguerite of Salisbury,—bright crimson; free flowering in way of *Capensis*.

Martin Cuhazac,—bright red, shaded carmine; very free.

Mrs. W. Watson,—pale pink, with silvery back to petals.

Paul's Cheshunt Scarlet,*—most vivid scarlet-crimson, semi-double.

Paul's Single Crimson,—crimson, yellow stamens.

Paul's Sin

Pride of V

Princess Louise Victoria,—light pearl or rosy flesh; very free.

Victor Verdier,—bright cherry-red.

ROSES, MOSS.

The Moss rose is supposed to be an accidental sport of the Provence rose.

This rose above all others requires a warm rich soil, with an airy exposure; moisture and shade also seem essential to preserving the mossy character; but this moisture must not partake of the stagnant nature. To ensure a fine autumnal bloom

of moss roses, the soil should be deep and rich; if not so naturally, the roses should be lifted annually or biennially, and replanted with some rich fresh compost at their roots. When grown as standards, they should be budded on the dog-rose; but they do best budded on short stems or on their own roots, and pruned close.

The following list gives a few of the best moss roses, from Messrs. Paul and Sons' catalogue.

Angelique Quetier,—pale lilac rose, one of the best mossed and freest.
Baron de Wassenacer,—bright red, flowering in clusters, good form.
Blanche Moreau,—very large pure white, well mossed.
Celine,—flowers deep rosy-crimson, shaded with purple.
Common Moss,—flowers pale rose; very large and full, well mossed and globular.
Comtesse de Murinais,—flowers pale flesh-colour when newly opened, changing to white; large and very double.
Created,—bright rose, very large and full.
Crimson Globe,—large deep crimson flowers of globular shape, well mossed.
Gloire des Mousseuses,—blush, very large and full.
Julie de Meraut,—very beautiful rosy pink.
Lanelli,—rosy-crimson, tinted with purple.
Muscosa Japonica, crimson, very much mossed.
Nuits d' Young,—blackish crimson.
Œillet Panache,—tinted white, striped with bright red, well mossed.
White Bath,—paper white, large and full.
Zenobia,—large and globular in form.

ROSES, NOISETTE.

Of all the Noisette roses, nothing can equal "Cloth of Gold," "Solfaterre," and "Maréchal Niel." The first does not bloom so freely as the other, but it is superlative when it does bloom. Both "Cloth of Gold" and "Solfaterre" do best when allowed to grow freely without much pruning; and, unless in the extreme south of England, both require a wall with a south or west aspect. During severe weather they should also be protected. "Maréchal Niel" will do well in some warm localities out of doors in a south aspect, but is better under glass. The following list comprises the best roses of this class:—

Aimée Vibert,—a universal favourite, white, small but full flower in large clusters, very hardy.
Bouquet d'Or,—deep yellow, copper-coloured centre large, full, climbing habit.
Celine Forestier,—rich yellow, deeper in centre, very hardy, fragrant and good bloomer, good for south wall or conservatory.
Cloth of Gold,—sulphur-yellow, deeper in centre, shy bloomer, requires south wall.
Fellenberg,—bright crimson, brilliant and free bloomer.
Jaune Despres,—fawn and yellow, tinted with rose, very fragrant.
Lamarque,—very fine, pale lemon, very large when fully expanded.
Lily Mestchersky,—violet red, medium-size, but good form, good pillar or climbing rose.
Madame Alfred Carrière,—fresh white, salmon-yellow at base of petal, large and well shaped.
Madame Auguste Perrin,—pale rose, petals whitish at back, medium size but well shaped.
Madame Caroline Kuster,—pale lemon, with canary-yellow centre, fine large bloom.
Maréchal Niel,—rich brilliant yellow, large, deep, full and well-formed, good for conservatory.
Ophirine,—very peculiar-formed and unique-coloured rose, bright salmon and fawn.
Perle des Blanches,—pure white, bloom perfect in form and of full medium size.
Rêve d'Or,—deep yellow, sometimes with coppery tinge, large full bloom, growth vigorous.
Solfaterre,—sulphur-yellow, strong, large bloom.
Triomphe de Rennes,—fine canary-yellow, large and full.
Unique Jaune,—coppery-yellow, shaded with vermillion, clusters of bloom, full, but of medium size.
William Allen Richardson,—orange-yellow, large well-formed flower, vigorous growth.
Yellow Noisette,—lemon centre, flower large and very double.

ROSES, PLANTING OF.

At the proper time, having selected the sorts of roses suited for the purpose, and of one or two seasons' growth from budding, and having cut off with a sharp knife all damaged root fibres, we proceed to plant. Good ordinary garden soil will produce the rose large enough for ordinary purposes; but to grow it in perfection, unless a bed has been previously prepared in the manner directed above, a hole in the ground should be opened 2 feet square and a foot deep. This station should be filled with a compost consisting of two good sized spadefuls of thoroughly rotted dung for each plant, mixing it well with the soil. Upon the soil thus prepared the standard rose is placed, the collar just above the level of

the surface, and the fibres carefully spread out over the soil. Fill in the remaining soil and replace the turf, treading it gently until it forms a small mound, out of the centre of which the tree rises. A stake is now driven into the ground, near enough to support the stem, which is tied to it.

Season for Planting.—The season for planting may be any time from the fall of the leaf till the buds again begin to swell, in April or the beginning of May. After that there is danger of the tree dying off.

Pruning.—In pruning newly planted roses, the object is to balance the head to the vital powers of the fibrous root, which has not yet thrown out its spongioles, and to give a graceful form to the intended head. If there be only one shoot from the bud, cut it down to two eyes; if there be a regular head formed, cut away every shoot down to the lowest eye that points outward or downward, and cut away all weak shoots or thin ones that come in the way of a better, back to their base, leaving only such as are required to form the head of the tree. When the buds begin to break, rub off all that grow inwards, all that would cross other branches, all that are coming weakly, and all that would crowd the head and destroy its cup-like form. It is not a good practice to prune roses immediately after planting them. The tops should be left on for a month or six weeks, and then cut back or headed in to three or four buds from the stock. This will insure a healthy, vigorous growth. After the plants are established, the shoots may vary in length from 4 to 16 inches. The weaker the growth, the closer should they be pruned, and *vice versa*.

ROSES, PROPAGATION OF, BY BUDDING.

The stocks most commonly used for budding and grafting roses on are the common dog-rose of the hedges, and the Boursault and Manetti roses, both of which are ob-

tained by cuttings, the former being a good stock for tea-scented and Chinese roses, and the latter for the hardier roses, where vigorous growth is required. The dog-rose, however, is preferred by many for all purposes. The best time for procuring stocks for planting in ordinary soil is in the autumn, in October and November; but where the soil is inclined to be moist, it is better to obtain them in the spring. The best stocks are those of two or three years' growth, a little under an inch in thickness, with the bark fresh, and having greyish-green stripes. It is remarked that the graft does not take well where the bark is red-coloured. The stock should be of proper length, well rooted in the soil, free from spines, and without branches.

Time for Budding.—The process of budding may be done successfully at various seasons, the first condition being that the branch and stock are in the same state of vegetative progress. The dog-rose is in its best condition for operating on in July or August; to operate earlier is considered a disadvantage. Under very favourable conditions of weather, they may be worked as late as September; but vigorous growing roses like the Provence, Moss, Gallican, Damask, Austrian, and other summer roses, are best budded in the former months. Those stocks, on the contrary, which grow luxuriantly and late, as the Manetti and crimson Boursault, are better worked in the beginning of September. Perpetuals, Bourbons, Noisettes, China, and Tea roses, and all the autumnal late bloomers when budded on the dog-rose, succeed best in July and August.

Conditions for Budding.—The conditions required in budding are that the bark should rise freely and that the shoots are getting a little firm; the buds will then take admirably. In budding, the top bud on the shoot should be commenced with, cutting from $\frac{1}{2}$ inch below the eye to $\frac{1}{2}$ inch

or $\frac{1}{8}$ inch above it. In removing buds, and especially from the stem, they should be cut very close, and, if large, the wound should be covered with grafting wax or clay. The operation should be performed quickly, and before the sun has time to dry up the juices of the bud; and when circumstances render delay imperative, the bud should be placed in the shade.

Operation of Budding.—The operation of budding consists in transferring from one tree to another a small piece of the bark with an embryo bud, and inserting it beneath the bark of another. The only instrument necessary is the budding-knife. The process consists in making a cross-cut just deep enough to cut through the bark, and a longitudinal downward cut, making the letter T. Then, with the thin handle of the knife, raise the inner edges of the bark under the cross-cut: it is now ready to receive the bud. This is procured by first removing the greater part of the leaf from a bud, leaving only the foot-stalk. Now make a longitudinal cut, about an inch in length, beginning below the bud and terminating above it, thus removing the bud with the bark, half an inch above and half an inch below the eye, with a thin slice of the wood: this is, the cushion or shield. Having removed the wood as clean as possible, the lower point of the bud is now inserted in the open slip formed by the T, and push in the bud, first on one side and then on the other, pushing it gently under until two-thirds of it are under the bark, so that the eye of the bud is exactly under the opening caused by the raised edges of the bark. The upper part of the bud is now cut across, so as to fit it exactly into the angle at which the bark of the stock was cut; it is now bound up with worsted or cotton thread, previously prepared. Tying commences at the bottom, passing upward until the whole is covered except the eye of the bud, sometimes a

little damp moss or a leaf being tied over it for the sake of the moisture it gives out. From three to five weeks after the operation, according to the dryness of the season, it is necessary to examine the bud, and loosen the ligature which binds it to the trees, otherwise the growth may be checked.

ROSES, PROPAGATION OF, BY CUTTINGS.

Most roses may be propagated by cuttings; but all are not calculated for being thus propagated, bottom heat being indispensable for the more tender varieties. Summer and autumn are the best seasons for cuttings. The shoot made in spring is taken with a small portion of last year's wood attached, and cut into lengths of 5 or 6 inches, selecting such as have two lateral shoots with five or six leaves to each. An inch of the old wood should be inserted in the soil, leaving at least two leaves above. From four to six of these cuttings may be placed round the inside of a small 3-inch pot, in soil consisting of equal parts of leaf mould, turfy loam chopped fine, and silver sand, watering them well with a fine rose, to settle the earth round the stems. When the water is drained off and the leaves dry, remove to a cold frame or place under handglasses, shade them from the sun, and sprinkle them daily for a fortnight. If threatened with damping off, give air and sun. In a fortnight the stems will have formed a callus. At this time they are greatly benefited by bottom heat; they root more rapidly, and may soon be shifted singly into 3-inch pots, and removed back to the cold frame, in which they should be kept till spring.

ROSES, PROPAGATION OF, BY SUCKERS.

Roses (some kinds much more than others) push their roots in a lateral direction under ground, and throw up young shoots or suckers from them. These

suckers, separated from the parent plant by the cut of a sharp spade, form flowering plants the same season, if separated in the spring and transplanted to suitable soil. When a rose-tree is shy with its suckers, it may be stimulated by heaping earth round the roots.

ROSES, SOIL, &c., FOR.

The rose grows vigorously in most kinds of soil ; nevertheless, it does best in a light free soil, a little fresh, amended from time to time with some well-decomposed manure. A calcareous soil is especially recommended. Delicate varieties do best in fertile, sandy soils, and in peat earth. The dog rose grows vigorously in stiff earth. For nearly all roses, however, the soil can scarcely be too rich. They delight in a stiff loam liberally incorporated with manure, and no excellencies of variety, climate, or culture can compensate for the absence of this indispensable desideratum. Where the natural soil is light and sandy, the whole bed should be removed to the depth of 2 feet, and replaced with the richest natural fibrous loam at hand, thoroughly mixed with decomposed dung.

ROSES, SUMMER.

The Summer Roses include the Provence ripened Provence and French *Roses* (*Rosa Gallica*), Moss Roses, Scotch Roses, Austrian Roses, and the beautiful double yellow rose known as *Rosa sulphurea*. The Summer Climbers include the Boursault and Ayrshire Roses, some Evergreen Roses, such as Félicité Perpétré, and Banksian Roses. The fine old favourite, the Cabbage Rose, is a pink Provence, the white variety being commonly known as the Provence Rose. Among the striped roses stand conspicuous the old York and Lancaster, with white petals, striped and flecked, carnation-like, with glowing streaks of red. The Moss

Rose, a variety of the Provence Rose, is too well known by its moss-like setting to require further mention. The Austrian Roses are all yellow in colour.

ROSES, TEA-SCENTED CHINA.

With protection (see *Roses, China*), many of the following tea-scented roses may be grouped in beds, in a similar manner to the common China roses. The best and hardest of these delightfully sweet-scented roses is Gloire de Dijon, a large buff-coloured rose with orange centre. It resists frosts, both on walls and as standards, when hundreds of the hybrid perennials will be killed :—

- Abricote,—bright rosy fawn
- Alphonse Karr,—purplish red, shaded crimson, large and well-formed, vigorous habit.
- Belle Lyonnaise,—deep yellow, changing to salmon, large and finely formed.
- Bougère,—deep rosy bronze, large and double.
- Catherine, Mérmet,—rosy carmine, flower large, full, and beautiful.
- Cheshunt Hybrid,—cherry carmine, large and full; good climbing rose.
- Gloire de Dijon,—fawn shaded with salmon, flower very large and fragrant, vigorous habit.
- Goubaul,—bright rose, buff centre, robust grower.
- Isabella Sprout,—sulphur-yellow, back of petals white, habit vigorous.
- Madame Damaizin,—pale rose and salmon, free bloomer.
- Marie von Houtte,—yellowish-white, striped and edged with bright rose, large and full bloom.
- Perle des Jardins, varying from pale yellow to deep canary, splendid well-formed bloom.
- Pink Gloire de Dijon,—deep shade of pink, but otherwise similar to Gloire de Dijon.
- Reine Marie Henriette,—beautiful reddish-cerise, flowers like those of Gloire de Dijon in form, very vigorous.
- Reine Marie Pia,—deep rose, crimson centre, large bloom, vigorous habit.

The very best of the tender tea roses is Devonensis, a creamy white, large, truly magnificent variety ; for beauty of bud, size, consistence, and perfume of flower, it stands unrivalled. It has a peculiar odour, all its own, and may be known out of a hundred by the scent alone. The leaves, too, are beautiful and glossy, the habit good, and for a tea rose it is a robust grower. It will do well in a sheltered situation out of doors in summer.

and a clean sunny window will be the spot for it in winter, failing a little greenhouse.

SALVIA.

The sweet herb known as sage, *Salvia officinalis* (see *Sage*), has been already noticed. There are, however, many species belonging to the genus, and some of these are annuals, others biennials, and others perennials, which are grown in the garden as ornamental bedding plants. Chief among these are *S. patens*, a half-hardy perennial with flowers of a beautiful deep blue, and *S. splendens*, a greenhouse shrub,



SALVIA SPLENDENS.

with fine scarlet blossoms. *S. fulgens* is another beautiful greenhouse shrub with scarlet flowers. A rich soil is necessary for salvias, and protection under glass during the winter. They are propagated by seeds and cuttings, sown or set in rich soil and placed in a frame with gentle bottom heat. If raised from seed, the seed should be sown very thinly and placed in a frame over gentle bottom heat.

SAPONAR'IA.

Of these charming little plants it is impossible to speak too highly; they carpet the ground with their pretty little star-shaped flowers during the summer and autumn months. For edgings they are

unequalled, bearing cutting back, if necessary, for a late autumn bloom; in beds they produce a fine effect, while in ribbons, the pink, rose, and white make a striking combination. The hardy perennial trailer,



SAXIFRAGE FOR ROCK-WORK.

Saponaria ocymoides, or Rock Soapwort, flowers so profusely in the spring and early summer months as literally to present to the eye a sheet of rosy pink: a fine rock-plant. Chief among the annuals are *S. Calabrica*, with flowers of a rich deep pink, $\frac{1}{2}$ ft., and its varieties, *S. C. rosea* and *S. C. alba*, with rose and pure white flowers.

SAXIFRAGE.

A very large genus of plants that are for the most part perennial, and are very hardy and easy of cultivation. Many species are



THICK-LEAVED SAXIFRAGE, OR SOW'S EAR.

rock plants, invaluable for rock and root work. They are easily propagated by cuttings on division of the root, except in the case of *Saxifraga Sarmentosa*, also called "Creeping Sailor" and "Mother of Thous-

SCABIOUS—SCILLA.

sands," which is propagated like strawberries, by stolons, or creeping and hanging runners. "London Pride" (*S. umbrosa*) is



SAXIFRAGE—"MOTHER OF THOUSANDS."

a saxifrage, and a plant that does well in the shade.

SCABIOUS.

This genus of flowers, consisting of a disc studded with numerous stamens, which have obtained for them the name of "Pin-



SAXIFRAGE—"LONDON PRIDE."

cushion" flowers, and surrounded with petals, blue, lavender, rose, purple, and yellowish white, is fairly large, and comprises many hardy annuals and perennials, propagated by seed and division of the

roots. The most noteworthy perhaps are *Scabious arvensis*, or "Gipsies' Rose," the lilac scabious of the cornfields, and *S. atropurpurea*, or "Mournful Widow," a dark purple species often found in gardens. They are chiefly useful as cut flowers for nosegays.

SCHIZANTHUS.

A genus of half-hardy annuals with flowers of pretty shape, variously coloured, from which it has obtained the name of the Butterfly Flower, or Fringe Flower. The plants are well adapted for pot culture in



SCABIOSA ATROPURPUREA.

good rich soil, and as border plants. If seed be sown under protection in autumn the plants raised will flower in the greenhouse or conservatory in early spring. The species chiefly sown in open ground as a border plant is *Schizanthus pinnatus*, which, with its varieties, is as hardy as all the ordinary hardy annuals.

SCILLA.

The species of this genus are very numerous, the best known being *Scilla sibirica*, otherwise the Bluebell, Harebell, or Wild Hyacinth. They are spring flowering, bulbous plants, and as such their culture and propagation is the same as for

bulbs, which see. *S. Sibirica*, or Siberian Scilla, is equally well suited for pot culture or growing in the open ground. *S. bifolia* is another useful species, but those



SCHIZANTHUS—"BUTTERFLY FLOWER."

that are most in use and their varieties will be best ascertained by reference to the bulb catalogues of the seedsmen and nurserymen.

SEA PINK, THRIFT, OR ARMERIA.

Hardy herbaceous perennials propagated



SCILLA NUTANS, OR BLUEBELL.

by division of the plant. Formerly it was much used for edging borders. *Armeria vulgaris*, with rush-like foliage and red flowers, is the crimson thrift of the garden.

A. litoralis and *A. maritima* are found by the sea side. A sandy loam is the most suitable soil for this plant.

SEDUM, OR STONECROP.

The common name of a large and important family of plants chiefly suitable for rock work and culture in hanging baskets. They are mostly herbaceous perennials, but there are a few annual and biennial species among their number. The leaves are generally thick and fleshy, varying in colour and form. In many varieties the leaves are of a pale green, as in *Sedum tigrinum*, or Siebold's Stonecrop, in which, as



SEDUM SIEBOLDII, OR SIEBOLD'S STONECROP FOR

the flowers begin to fade, the leaves assume a reddish tinge. In this variety the flowers, which proceed from the end of the long stalks or branches on which the leaves, slightly notched, grow in whorls of three, are pink in colour, but in the great majority the flowers of plants belonging to this genus are white and sometimes, but very rarely, blue. Any of the sedums will grow luxuriantly in pots or any common garden bed, and do well, as already said, on rockwork, in the open border, or on walls, especially those of ruins fast going to decay. The best known are *S. Sieboldii*, already mentioned. *S.*

SEMPERVIVUM—SENECIO.

commonly known as Wall Pepper, and *S. spectabile*, of two of which illustrations are given.

SEMPERVIVUM.

A large genus of shrubby herbs of curious form and habit, mostly hardy perennials, although some require the protection and warmth of a greenhouse. An example, likely to be familiar to all, may be found in *Sempervivum tectorum*, the Common Houseleek, or Sengreen, which grows on roofs and the top of thick walls, and often increases to such an extent as to cover a



SEDMUM ACRE FOR ROCK-WORK.

considerable area. The flower is red, the leaves ciliated at the edges, and pale green in colour with a brown tip. *Sempervivums* are well suited for rock-work; they like a sandy soil, and are propagated by offsets taken from any old-established plant.

SENECIO.

A very large genus of annual, biennial, and perennial plants, some hardy and fit for outdoor culture, while others are only suitable for the greenhouse or hothouse. The common names are Groundsel and Ragweed or Ragwort. The weed so well known in the garden as Groundsel is

Senecio vulgaris, the plant called Ragweed being *S. Jacobaea*. The Senecios in cultivation, and these are by no means numerous, like a good loam. The annual species are, as a matter of course, propagated by



HOUSELEEK.

seed; perennials by the division of the roots. *S. elegans* is a species suitable for garden culture. It bears a purple flower, but some of its varieties have flowers white and deep red in colour. One variety of *S. elegans* is known as "American Groundsel"; the blossom is double and



SENECIO ELEGANS.

of a pretty purple colour. This is best suited for outdoor culture by amateurs. *S. pulcher*, with purple petals ranged round a yellow disc is an excellent perennial species for borders.

SHRUBS, DECIDUOUS.

There is a large number of deciduous shrubs, most of which blossom freely. There are different sorts of *Berberis*, or barberry, some evergreens and some deciduous, but bearing in every case a pretty yellow blossom; *Amygdalus communis amara*, the bitter almond; *A. dulcis*, the sweet almond; *Buddleia globosa*, the globe-flowered buddlea, which is very ornamental, with its orange blossoms and lanceolate leaves; the *Daphne Mezereum*, the common mezereum, and *D. M. album*, the white-flowered variety; also three or four varieties of the elegant and free-flowering



SILENE PENDULA—SINGLE VARIETY.

Deutzia. The different sorts of *Genista*, or broom, the *Robinia*, and the many kinds of *Spiraea* must not be omitted here.

SILENE.

A genus containing a considerable number of species, among which are numbered the plants known as Campion and Catchfly. They are for the most part annuals, biennials, and perennials. Most of them are extremely hardy. They like a rich loam, and are propagated according to their kind by seeds, cuttings, slips or divisions of the roots. The Silene common in our hedges, with a pink and white star-like flower, is *Silene anglica*. Many are suitable for rock-work, as, for example, *S. pendula* with flesh-coloured flowers, and

S. p. compacta with bright pink blossoms. *S. Armeria* is the Sweetwilliam Catchfly; *S. inflata*, the Bladder Campion or Catchfly; *S. regia*, the Royal Catchfly



SILENE PENDULA—DOUBLE VARIETY.

with scarlet flowers; and *S.* the Virginian Catchfly or Fire Pink, with deep crimson flowers.

SNOWDROP.

This is one of the most elegant and interesting of spring flowers: it may be had in bloom indoors at a very early period; its white blossoms contrasting



beautifully with the rich hue of the crocus, &c. A row of snowdrops is often very effective in juxtaposition with a row of blue crocuses. October is the best month

for procuring and planting them, although they may be inserted much later. There are many varieties of this beautiful bulb, but Elwesii, or Giant Snowdrop, is most



effective and valuable for pot culture indoors.

SNOW'FLAKE. See *Leucojum*.

SPHAGNUM.

A kind of moss from bogs and swampy places used in gardening as a cool and moist material for packing plants and also for filling baskets in which to grow epiphytal orchids.

SPIRÆA.

A genus of shrubby plants, mostly hardy perennials, bearing pyramidal spikes of pink or white flowers, thriving in rich loamy soil, and requiring plenty of water. They are propagated by division of the roots or by offsets taken from the side of parent root stock. The *Spiraea japonica* is much used for winter decoration of the conservatory, and large consignments for this purpose are received from abroad. The Common Meadow Sweet (*S. ulmaria*) is a beautiful species of this genus indigenous

to Britain. See *Monthly Calendar for November—Flower Garden, Work in.*

STOCKS—MATHI'OLA.

The plants known as Stocks are mostly half-hardy biennials, but some are annuals. They are propagated by seed, and all thrive best in a rich and not too dry soil.

The Stock Gilliflower is one of the most popular and important of our garden favourites; its delicious fragrance, brilliant and diversified colours, profusion and duration of its bloom, make it invaluable for flower beds and borders, for edgings, ribbons, and pot-culture.

The Ten-week Stock (*Mathiola annua*) is the most universally cultivated. It is so called because it usually blooms ten or twelve weeks after being sown, grows from 6 to 15 inches high, and when cultivated in rich soil and occasionally watered with very weak guano-water, throws out an immense quantity of lateral spikes of bloom, so that a plant forms a perfect bouquet: it would indeed be very difficult



DOUBLE TEN WEEK STOCK.

to surpass the grand effect produced by these exquisite floral genii.

The Imperial or Emperor, sometimes called Perpetual Stocks, are half-hardy

biennials, hybrids of the Brompton, growing 18 inches high, and of a robust branching habit. Sown in March or April, they make splendid "autumn-flowering stocks,"



BROMPTON STOCK.

and form a valuable succession to the summer-blooming varieties. Should the winter prove mild, they will continue flowering to Christmas. Sown in June or July, they flower the following June, and continue blooming through the summer and autumn months.

The Brompton and Giant Cape are generally called winter stocks, on account of their not flowering the first year : the former is robust and branching, the latter possesses the characteristic so much esteemed by some, viz., an immense pyramidal spike of bloom. These are half-hardy biennials. The seed should be sown early in May in a light sandy border with an eastern aspect. It succeeds best sown thinly in drills about 6 inches apart. As soon as the plants show their second leaves they should be watered every evening with a fine rose pot. When about three inches high they should be thinned out to at least 6 inches apart and the other plants removed to another bed. In about a month's time they should be thinned again and the alternate rows taken up, so

as to leave the remaining plants about a foot apart every way. These may be suffered to flower where they stand, or they may be transplanted to the flower-borders in August or September. Great care is necessary in transplanting not to expose the roots, and the new soil should be of the richest description possible. The plants will require shading till they are established, and watering with liquid manure till they begin to flower. Thus treated the flowers will be splendid.

STONECROP. See Sedum.

SWEETWILLIAM.

The Sweetwilliam, or *Dianthus Barbatus* and its varieties, is a hardy perennial, a splendid free-flowering garden favourite, producing an unusually fine effect in flower beds, borders, and shrubberies. Amongst these the varieties known as auricula-flowered are remarkable for their rich, varied, and beautiful colours and immense heads of bloom, which surpass in effect even the handsomest of the perennial phloxes. They thrive in any good garden soil, and are propagated by seeds or by offsets and layers from the parent plant.

SYRINGA.

The name of a genus numbering about



SWEETWILLIAM.

ten or a dozen species of hardy deciduous shrubs, better known under the name of "Lilac," which is commonly applied to

them. Lilacs bear highly fragrant spikes of blossom, generally pale bluish-purple, of a lighter or darker shade, or white. They are well known as the sweetest and prettiest of the flowering shrubs that adorn the garden in spring. They thrive in any fairly good soil, and are propagated by suckers chiefly. Special-named varieties are kept true to sort by crown or cleft-grafting done in March. *Syringa vulgaris*, with red, blue, or white flowers, is the Common Lilac of our shrubberies and borders. There are many varieties, of which Charles XII. is darkest in colour. The white varieties are attributed to an absence of colour caused by blanching when undergoing the process of forcing for early blooms.

SYRINGA, OR MOCK ORANGE.

The *Philadelphus coronarius* is far better known under the name of Syringa than the true Syringas, or Lilac, mentioned in the preceding article. The smell, muddled by its white blossoms, is considered to resemble that of the orange flower, whence its name, Mock Orange. It is a hardy shrub, as are all the other species belonging to the genus. Like the lilacs, it will grow well in any good garden soil, and is best propagated by suckers or layers. The leaves, when crushed, have an odour resembling that of the cucumber. There are many varieties of *P. coronarius*, one of which, *P. c. primuleflorus*, has double blossoms, while others are distinguished by their leaves, one having leaves edged with white, another, leaves edged with yellow, and a third with leaves of a golden yellow.

TACSONIA.

A grand genus of the Passiflora family, yielding to no twining shrub in cultivation for the dazzling brilliancy, size, and beauty of its flowers, which are produced in great profusion for months in succession. To those who have experienced difficulty in

blooming the varieties of this magnificent genus the following information will be useful and acceptable. To flower the *Tacsonia* successfully, it should be frequently stopped as the flowers are produced upon the lateral shoots; it should be grown in rich soil, and frequently syringed during warm weather to induce a vigorous growth; thus treated it will cover a large space in an incredibly short period, and bloom most profusely. For culture, &c., see *Passion-flower*.

TAGETES. See Marigold.

THU'JA.

A splendid genus of hardy ornamental shrubs; the beautiful colour of their foliage, combined with their symmetrical growth, renders them desirable objects for lawns or shrubberies; they succeed in any garden soil. *Thuja aurea variegata* is an especial favourite. Of the *Thuja*, or *Arbor Vitæ*, genus, the varieties are mostly of middle size, varying in colour from a bright yellowish-green to golden. They are very valuable in small gardens, for contrast with shrubs of both a lighter and darker tint. They will grow in any common soil.

THUNBER'GIA.

A genus of slender and rapid-growing climbers, with extremely pretty and much-admired flowers, which are freely produced, either when grown in the greenhouse or in a warm situation out of doors: they delight in rich loamy soil. Most of the varieties are half-hardy annuals, but *Thunbergia coccinea* may be named as a greenhouse perennial, and blooms in clusters or racemes of orange-red flowers. Among the annuals may be named *T. alata*, orange, with rich brown eye, and *T. alata alba*, white, with rich brown eye. They like a rich mould plentifully mixed with well-rotted manure.

and are raised from seed and cuttings subjected to gentle bottom heat.

TRADESCANTIA.

A genus of pretty perennial plants, some of which are hardy and suitable for planting,



TRITELEIA UNIFLORA.

out of doors, while others require the shelter and warmth of a greenhouse. They are mostly trailing plants suitable for hanging baskets and pots, and are easily propagated by cuttings or division of the root, the greenhouse species requiring to be placed in light soil in gentle heat, and the hardy species in any good garden ground. The leaves are sometimes striped. *Tradescantia Virginica*, otherwise known as Common Spider Wort, and its varieties, may be named as fitting representatives of the hardy species, and *T. zebrina*, otherwise known as *Zebrina pendula*, of a species with striped leaves.

TRITELEIA.

A genus to whose species the name of the "Triplet Lily" is sometimes given. They are bulbous plants, half hardy in character, and are useful as pot plants or in borders, and even on grass, like snowdrops. They require a good rich soil, and the ground or pots in which the bulbs are planted should be efficiently drained. *Tri-*

teleia aurea, with yellow flowers, is a useful species, and so is *T. laxa*, with blue flowers, also known as "Ithuriel's Spear." A third is *T. uniflora*, or Spring Star Flower, with flowers of a pale lilac colour.

TRITO'ME, OR KNIPHOFIA.

An exceedingly showy free-flowering plant, with long graceful leaves and majestic flower-spikes, three to seven feet in height, crowned with densely flowered spikes of bloom, which are produced during the autumn months, 18 to 27 inches long.

Culture.—Dig and well work the soil to the depth of 2 or 3 feet, adding plenty of rotted manure. The crown of the plant should not be more than an inch and a half in the soil; for winter protection surround the plant with two inches of sawdust, firmly trodden. Remove this in May: from then till the plant is in bloom weak liquid manure must be applied in large quantities, especially during dry weather.

The best species for garden culture is



TRITOMA UVARIA.

Tritoma aloides, with spikes of orange scarlet flowers, changing to orange and then to a greenish yellow, known as the "Flame Flower" and "Red-hot

Plant"; this species is also known as *T. Uvaria*, or *Kniphofia Uvaria*.

TROPÆOLUM.

A tribe of elegant-growing, profuse-flowering, and easily cultivated climbers,



TROPÆOLUM LOBBIANUM.

half-hardy annuals, combining with these important qualities great richness and brilliancy of colour, with finely formed and beautifully marked flowers. For pillars and rafters, in the greenhouse or conservatory, they are invaluable; for covering trellises, verandas, and bowers out of doors, they are of equal importance; while for bedding purposes they are excellent, especially when of dwarf habit. When used for bedding, the trailing varieties should be regularly and carefully pegged down, interlacing the shoots, and occasionally removing the large leaves. In pleasure grounds, where the beds are sometimes protected with fancy wire-work against the depredations of rabbits and hares, the tropaeolums are invaluable for covering it, as they grow rapidly, are easily trained, and continue flowering the whole summer and autumn.

Nothing further need be said about the ordinary outdoor varieties, the seed of which may be procured from any seedsman, producing flowers of all shades from the palest straw colour, through orange and red of different depths of tint to a dark, rich reddish brown. For outdoor use, for covering trellises, summer-houses, &c., *Tropæolum Lobbianum*, *T. majus*, and *T. peregrinum* are especially desirable; and it may be added that *T. Lobbianum* blooms beautifully through the winter months in the greenhouse or conservatory, so that where cut flowers are in demand they will be found an invaluable acquisition. It will grow freely in light rich soil.

There are tuberous-rooted varieties of the *Tropæolum*, such as *T. azurium*, with azure-blue flowers, and *T. tricolorum*, with orange-scarlet flowers, tipped with black, which are only suited for greenhouse culture.



TROPÆOLUM PEREGRINUM.

TU'BE'ROSE.

A bulbous-rooted plant from the East Indies; flowers white, very odorous. They require to be started in a pit. In January plant the bulbs singly in very small pots in sandy loam; plunge them in

a pit of moderate heat; give little or no water till they have made a start, then water sparingly. When they have filled their pots with roots, shift them and re-plunge



be given for the bed to settle, rake the smooth, leaving the bed 3 inches above the path.

Time for Planting.—The best time for planting is the last fortnight in October, or early in November.

Planting.—When the bed is perfectly ready to receive them, the bulbs are placed in seven rows across the bed, and 6 inches apart in the rows. They are pressed in a little; soil is then placed upon them, 3 inches above the crown of the bulbs, so that the bed being raised in the centre, the middle row will be covered 4 or 5 inches. The bulbs are planted, of course, according to their height and colour—those growing 15 or 18 inches occupying the outside rows; the second rows on each side are those

them until they show bloom, when they may be removed to the greenhouse, where they will last in flower about two months.

TU'LIPS.

Soil.—The perfection of soil for tulip-culture would be three inches of the top of a rich loamy pasture, the turf of which, cleared of wireworm, grub, and insect, has lain by till thoroughly rotted, and which has been repeatedly turned and picked: the decayed vegetable matter will suffice without other dressing.

Preparation of Bed.—The tulip bed should run north and south, with drainage perfect, but without stones or rubbish at the bottom. The bed may be dug out 4 feet wide and 2 feet 6 inches deep, and the compost previously prepared filled in till it is a few inches above the path, the centre being 2 inches higher than the sides. All water must be withdrawn from the bottom of the bed: it is not enough to give drainage, unless an outlet is found, so as to avoid stagnant water. A few days should



TULIPA GESNERIANA—SINGLE VARIET

growing 2 feet, and those growing 2 feet 6 inches occupy the three centre rows. When planted and covered, they may be left until the leaf-buds begin to peep through the

ground. Of course the sides of the bed must be protected by edgings either of wood or tiles.

Protection against Frost, &c.—As frost



TULIPA GESNERIANA—DOUBLE VARIETY.

approaches, while giving as much air as possible, they should be protected against it by mats or other shelter, but not longer than is necessary; otherwise they get drawn up weakly. In February they begin to appear, when the ground should be stirred, all lumps broken, and pressed close round the stems. As the spikes begin to open, they form a receptacle for the wet, and the frost must not be then allowed to reach them. When the colours begin to show, in order to protect their bloom, a top-cloth must be provided to shelter them from the sun, taking care that no more air than is absolutely necessary is excluded, the cloth being let down on the sunny side only, and that only when the sun is powerful.

Storing Bulbs.—Soon after tulips have finished flowering, the leaves will ripen and die off. They should be immediately taken up with all the soil that will adhere to the bulb, slightly dried, and put away in drawers or paper bags, each sort by itself. During the summer they should be fre-

quently looked over to see that they are not decaying. On the 1st of October rub off all the offsets, and plant them by themselves, and prepare for planting the entire stock forthwith. For the names and colours of special sorts of the tulip, whether dwarf or show, the reader is referred to the price list of any nurseryman and seedsman who provides a large stock of Dutch bulbs for sale in autumn.

Classification.—Tulips are divided into Roses, Byblomens, and Bizarres. *Roses* have a white ground, and crimson, pink, or scarlet markings. *Byblomens* are those having a white ground, and purple, lilac, or black markings. *Bizarres* have a yellow ground, with any coloured marks that present themselves. *Self-tulips* are those which are of one colour, such as white or yellow, showing no inclination to sport into other colours.

and spring decoration under glass the tulip may be placed next to the hyacinth. The single and double dwarf Duc van Thol tulips are



PARROT TULIP.

for this purpose most valuable. There are also several large flowering double tulips, which produce a brilliant display. The former may be planted, six or eight bulbs

in a good-sized pot ; but of the latter three bulbs will be sufficient. All tulips require a good supply of water when in flower, and to be shaded from the sun. The single



URTICA NIVEA.

Duc van Thol is the earliest of all. If these be planted in September they may be had in bloom before Christmas, and by later planting, a succession may be kept up for some time. Of the large double tulips, which are remarkably showy, the best varieties are *Imperator rubrorum*, Duke of York (bronze crimson with a yellow margin), Extrémité d'Or (rich crimson bordered with orange), La Candeur (pure white), and Tournesol (scarlet and yellow). The soil and treatment necessary for these, whether grown in pots or in the open ground, are the same as recommended for hyacinths, *which see.*

Parrot Tulips.—The parrot tulip has a singularly picturesque appearance ; the flowers are large and the colours brilliant, so that when planted in flower borders and the front of shrubberies they produce a most striking effect. When grown in hanging baskets, and so planted as to cause their large gay flowers to droop over the side, the effect is remarkable and unique.

ULEX.

This is the botanical name for the Furze, of which there are several varieties. All are free-flowering evergreen shrubs with yellow blossoms : they may be propagated by cuttings, and most of them from seed, which they produce and ripen freely. The double-blossomed furze is singularly beautiful and very useful for hedges. Where furze of any kind is used for this purpose, the best plan is to raise a bank the height desired, wider at bottom than at top, and along the ridge to plant the cuttings or sow seed, as may be preferred.

URTICA.

The common nettle, *Urtica dioica*, is known to every one as a wayside weed. There are, however, some beautiful varieties well worthy of garden cultivation. *U. reticulata*, from the West Indies, is remarkable for its dark green foliage and red and yellow flowers. *U. nivea*, from China, is a half-hardy perennial, with fine leaves, the under side of which is silvery white ; a



fine plant for flower borders or the centres of beds ; grows in light rich soil ; blooms freely the first year. This plant yields the fibre called Chinese grass.

UVULARIA.

A genus of bulbous plants, mostly hardy North American perennials, bearing flowers of a pale yellow. Like most American



COMMON VALERIAN.

plants, they succeed best in bog earth. They produce an abundance of offsets, from which their propagation is very easy.

VACCINIUM.

This is the name of a large genus which includes the Whortleberry (*Vaccinium myrtillus*), a pretty little heath-like shrub with drooping flowers and showy fruit. The Whortleberry is also known as the Bilberry, Bleaberry, and Blueberry. The Cranberry (*Oxycoccus*) belongs to the same order, but to a different genus. The *Vaccinium* require peaty soil

VALE'RIAN.

Perennial plants suitable for rock-work. The best known is *Valeriana officinalis*, the Common Valerian, also called All Heal and St. George's Herb, noticeable for its pink flowers growing in loose corymbs. They are propagated by division of the roots, and do well in any ordinary soil.

VALLOTTA.

A beautiful lily, better known as the Scarborough Lily than by its botanical name, *Vallotta purpurea*. It is a handsome bulbous plant, and is suitable for greenhouse culture. The bulbs should be planted in June or July in large deep pots, with the crown of the bulb at least 6 inches below the surface of the soil in a compost composed of equal parts of good fibrous loam, leaf mould, and sand. The bulbs should be planted firmly and left undisturbed to establish themselves. They require water and even liquid manure when growing and in flower.

VERBE'NA.

One of the most useful of bedding plants, a native of South America. The named varieties are infinite; every year adds many novelties to the list, so for these it is best to refer the reader to the price lists of the growers. The plants seed freely, and are of easy cultivation by cuttings; they also root rapidly by being pegged down.

The best mode of propagation is by cuttings, say, a score of cuttings in a



VARIETIES OF THE VERBENA.

48-sized pot. The pots are filled one-third full of drainage, 1 inch of rough leaf mould over it; then fill to within $\frac{1}{2}$ inch of the top with equal parts of loam,

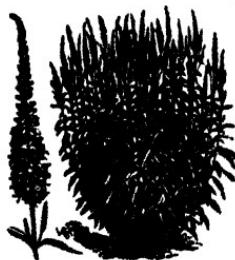
leaf mould, or peat and sand, finishing with half an inch of sand ; insert the cuttings in the usual manner, making sure that the base of the cutting is made firm. Water-level—a point of great moment in excluding the air from the part where roots are to be emitted, as well as in the future watering of the cuttings—and the work is finished. Verbenas are also best left in the store or cutting pots until February ; and, unlike calceolarias, if enough are kept over the winter for stock, spring-struck plants are best both for growth and flower. This last remark is equally applicable to petunias, ageratum, lobelias, &c. Verbenas and other soft-wooded plants may also be struck in water ; but I see no benefit whatever in the practice. I may also state, for the very few who do not know how to make a cutting, that the usual practice is to cut part of a branch level across at the base of a single leaf or pair of leaves, to remove this leaf or leaves, and place this part, the bottom or thick end of the cutting, in the soil, water, or damp moss, until it is rooted."

The vervains, such as *Verbena hastata*, otherwise the Blue Vervain, or Wild Hyssop, and *V. officinalis*, the Common Vervain, or Holy Herb, rank among the Verbenas. The garden varieties are numerous and excellent for bedding purposes : the best of them, perhaps, are Boule de Neige, white, a scented verbena ; Crimson King, crimson with white eye ; Lady Londesborough, mauve with white stripe ; Lustrous, vivid scarlet with large white eye ; Nemesis, very deep pink ; Purple King, purple. These are given as types of most of the different colours the garden plants present.

VERONICA, THE SPEEDWELL.

The evergreen shrubs of this genus, known as Veronicas or Speedwells, are, when well grown, amongst the most valuable of autumn-flowering plants. Their hand-

some, purple, mauve, or white spikes of flowers, which are produced in great profusion and in succession for months, make them invaluable for conservatory and sitting-room decoration, and for prominent positions out of doors, where, with a dry sub-soil and somewhat sheltered situation, the plants will generally stand the winter uninjured. The miniature annual varieties *Veronica Syriaca* and *V. alba* make very pretty small beds and edgings during the summer and autumn, but in spring they are much more effective ; we therefore recommend their being sown in autumn for the decoration of the spring garden. One of the prettiest of the veronicas is *V. chamaerys*, otherwise known as Germaner Speedwell,



or God's Eye, is indigenous to this country, and is easily recognised by its bright blue blossoms. The perennial veronicas thrive in any fairly good garden soil, and are propagated most readily by division of the roots or by cuttings.

VIBURNUM.

A genus of hardy deciduous trees and shrubs, with white flowers sometimes slightly tinged with pink. They thrive in any soil, and the shrubby species are most useful and beautiful in shrubberies. Of these the best known is *Viburnum opulus*, also called the Guelder Rose and Snowball Tree, from its white blossoms, which grow in cymes, almost globular in form. It is

VINCA—VIOLET.

easily propagated by suckers or layers, put down in the spring. The Common Way-faring Tree, *V. lantana*, is another shrub belonging to this genus.

VIN'CA.

This is the botanical or scientific name of



VINCA MINOR, OR LESSER PERIWINKLE.

the common Periwinkle, and of its class there are many beautiful varieties, of which *Vinca major elegansissima*, *V. major reticulata*, *V. minor argentea*, and *V. minor aurea*, are all variegated and very showy. They grow in any soil, and look well on rock-work. Under the name Vinca also are included many choice greenhouse evergreens, as remarkable for their shining green foliage as for their handsome circular flowers. Plants raised from seed which has been sown early in spring will be found useful for the ornamentation of flower beds and borders in warm situations. *V. major* and *V. minor*, otherwise known as the Band Plant, have blossoms of purplish blue, and are indigenous to this country. The

V. minor is smaller than that of *V. major*, and more than this, there is a white variety of it, and double blue and double white varieties as well. *V. ros*. with blossoms that are white, white with pink eye, or rose coloured, is also known as

Old Maid or the Madagascar Periwinkle. All the hardy sorts flourish in ordinary soil, and are propagated by division of the roots.

VIOLET.

This flower, the emblem of the Bonaparte family, is held in the highest estimation for its exquisite and delicate perfume. The common violet, *Viola odorata*, is a native of our own island. It is found wild, both purple and white. White violets are generally found in calcareous soils. The pansy or heartsease (*V. tricolor*), with its numerous varieties, is a species of violet.

Violets may be grown in pots, by placing two or three runners or offsets in a pot in May, and keeping them in the frame slightly shaded from the hot sun in summer. Loam and leaf mould suit them admirably. Russian violets, and sometimes the Neapolitan, will flower all the winter. True violets flower in March and April.



VINCA MAJOR, OR GREATER PERIWINKLE.

There are many varieties, but it will be sufficient to describe the culture of one or two sorts, as from this the treatment of the rest may be readily gathered.

VIOLET, NEAPOLITAN.

Summer Culture.—The Neapolitan violet may be propagated with advantage in June. When the plants have flowered for the season, remove them from the soil in which



COMMON VIOLET.

they have been grown, divide them into single crowns, cutting off all runners and selecting the finest only; then plant them out with the trowel 9 inches apart each way, pressing the ground firmly round the roots, selecting for the purpose a rich and well-prepared piece of ground with an east aspect, where they can receive the beams of the morning sun. In such a situation they are said to escape the ravages of the red spider and other pests, and to produce larger and brighter flowers. When the plants show signs of growth, stir the soil about their roots with a small hoe, and syringe them in the evenings of dry, hot days with pure water, pinching off all runners as they appear, and keeping the bed free from weeds; nothing more is required for their culture during the summer months.

Forcing in Pots.—For pot-culture, the best compost is formed of half-turfy loam turned over twice or thrice during summer, and half-rotten dung and leaf mould, well mixed together; this should be ready for use by the end of September. At that time the

violet plants must be raised from the bed in which they have been growing during the summer with as much earth to their roots as possible. They should then be divested of all their side-shoots or runners. The proper sized pots are 7-inch ones. One strong plant should be put in each pot; but when they are weak two or three. The pots should be well drained with broken bones instead of potsherds, for the roots of the violets will lay hold of the bones, which give vigour to the plants and make them bloom more profusely. The pots have the advantage of being available for the window garden, or for removal into the drawing-room or hall, as well as for cut flowers.

Management after Potting, and Protection under Glass.—Having potted as many as are necessary for the season, a good supply of water should be given to settle the soil well about the roots. A sufficient number of old melon-boxes with the lights belonging to them should be arranged in a southern aspect, placing the boxes in such a manner that the lights will throw off rain quickly, and thereby prevent drip, which in winter not only rots the plants,



NEAPOLITAN VIOLET.

but causes the flowers to be produced sparingly. The boxes being placed in position, a layer of old tan should be put into them 4 inches thick; in this the

pots should be plunged up to their rims in rows till the boxes are filled. It will be necessary to leave 3 inches space between the pots, where the plants are large, that air may be allowed to pass freely between and keep off damp, which is apt to destroy the plant. If they are so small as not to cover the top of the pots, they may be placed close together.

Temperature and Ventilation.—When the temperature is above 50°, the lights may be removed during the day, and at night they should be tilted up at the back for the admission of air. When the temperature is below 50°, the lights should be left on; but even then air should be admitted from behind during the daytime. When the temperature is below 40°, the admission of air should be very partial, if it be admitted at all. At no time after the plants begin to bloom should the lights be entirely removed, except for the purpose of watering or cleaning the plants, or gathering the flowers. When the weather is cold, coverings of mats should be applied at night. In hard frosts, two mats should be put on, as well as litter. The earth in the pots must never be allowed to freeze if it is possible to prevent it. The coverings must be removed in fine days. In March and April as much air as possible should be given if the weather is fine.

Watering, &c.—The pots should be examined at all times when the weather will permit. Weeds and decayed leaves must be removed, and a little water given when the soil is dry. Care must be taken to wet the leaves as little as possible. In March and April, if the plants have been properly managed, they will produce abundance of flowers, and consequently will require more moisture than winter.

VIOLETS, RUSSIAN.

To have an abundance of fine flowers in the autumn and early spring, these should

be planted in beds under a wall, in a warm aspect. The soil should be light, but very highly manured, with a large quantity of sand about 4 inches underneath the top soil. The roots should be planted in rows about 3 or 4 inches apart, and well watered. Every year, in April, immediately after they have done flowering, the beds should be broken up, the soil renewed, and fresh plants put in for another year.

VIRGINIAN CREEPER.

A favourite plant for covering an ugly wall or shed. Its flowers are very insignificant; but this defect is amply compensated for by its beautiful leaves, which



VIRGINIAN STOCK.

assume a most brilliant scarlet colour in autumn. Its growth also is very rapid: by some persons it is known as the Five-leaved Ivy.

VIRGINIAN STOCK.

A pretty little annual, the seeds of which may be sown at almost any season. It is sure to grow and bloom abundantly. Its botanical name is *Malcomia maritima*. It grows to the height of 6 inches; its flowers are red and white, beautiful for margina. By constantly picking off the seed, and liberal waterings, it may be kept in flower the whole summer.

VISCA'RIA.

There are several varieties of pretty little annuals so named, suitable for borders, small beds, and single lines.

Among these may be named *Viscaria*



VISCARIA CULATA.

9 inches, pink, dark eye; *V. o. nana coccinea*, 9 inches, scarlet, dark eye; *V. Damietta*, 12 inches, white, dark eye.

VIS'CUM.

The best known of this genus is the Mistletoe (*Viscum album*), curious and beautiful parasite, which, in our own country, is generally found on old cankered apple-trees, and certainly not upon the



SINGLE WALLFLOWER.

oak, with which it is traditionally associated. It grows also on the white thorn, the lime, and the sycamore; indeed on several forest trees.

WALLFLOWER.

For spring gardening the hardy perennials known as wallflowers (*Cheiranthus Cheiri*) are as indispensable as the crocus or the tulip, and from the delicious fragrance of their beautiful flowers they are especial favourites, producing a splendid effect in beds or mixed borders. On account of their variety, much interest is excited in raising them from seed.

The single wallflowers bear flowers varying from rich yellow and yellow striped with red to a deep blood red, and even to purple. The double wallflowers are yellow and a rich velvety brown red. These do not seed and must be raised from cuttings.



DOUBLE WALLFLOWER.

A double yellow wallflower trained against a wall will sometimes cover a space 4 feet in height and the same in width.

WEIGELA, OR WEIGELIA.

A genus of hardy shrubs of ornamental character, suitable for shrubberies, and calculated to do well in moist and shady places. They thrive, in fact, in any ordinary soil, provided that it is not too dry. They are easily propagated by the suckers which are thrown out by and from the parent plant. Cuttings also, put in in March or September, will root readily. *Weigela rosea*, with pink and white flowers, is perhaps the best known of all the species that are included in this genus. Of the

species just named there are three or four varieties, namely, *W. r. nana*, a dwarf form, and *W. r. n. aurea*, another dwarf form, with foliage of a rich yellow colour. By some the genus is called *Diervilla*, and *W. rosea*, *D. rosea*.

WINDOW GARDENING.

Aspects for Window Plants.—Of the plants suitable for various aspects, little need be said: the difference is not so great as might be imagined; but it may be taken as a rule that a sunny aspect is best for all flowering plants, except in the hot summer months, when they last much longer in bloom if kept in the shade. It is possible, however, to have blinds fixed to a south window, by which the plants may be shaded, or not, at pleasure. In the culture of some plants, as the auricula, for instance, it is advisable to give them a sunny aspect from October to May, and a shady one from May to October. Other plants, as ferns, may be constantly kept in the shade, although a little sun does them no harm, but the contrary.

Influence of Soil.—In the choice of soils for pot culture very much depends, but not in the way generally imagined. A few grim, sooty plants may occasionally be seen occupying a window ledge, and their appearance ascribed to the smoky atmosphere. This is, in fact, the case to a certain extent, but not wholly so; they are mostly potted in soil taken from the back yard, impregnated with foul gases, so that plants would not grow in it in the remotest part of the country. In towns, where proper soil can scarcely be met with, it is advisable to purchase it at some suburban nursery; stating the sort of plant for which it is required.

Suitable Composts for Plants.—All soft-wooded plants, such as geraniums, fuchsias, cinerarias, &c., do best in a soil composed of two parts yellow loam, one very rotten

dung, one leaf mould, with sand enough to make it porous; but some plants, such as ericas, epacridæ, and azaleas, require peat; and others, as the camellia, daphne, and correa, a mixture of peat and loam. Although the first-named soil will grow almost any plant, still those that require peat must have it, as no substitute will produce the same effects. It should be observed that soils ought not to be sifted, as a rule; to do so is contrary to what is observed in nature. In borders and ground of every kind devoted to the culture of plants of every kind, small stones and individual substances of various kinds are observed. These serve to keep the soil open, and to promote drainage and the admission of air, permeation of the surface soil by air being necessary to the healthy condition of all plants and crops.

Potting and Drainage.—In potting, adapt the pots to the size of the plants as near as possible—or rather, to what the plant is expected to be—as allowance must be made for growth of the root as well as the plant. Let the pots be perfectly clean. Effectual drainage of the pots does not consist so much in the quantity of drainage, as in the arrangement of it. A potsherd should be placed over the hole; some pieces of pot, broken rather small, over that; and these again covered with a layer of peat fibre or rough earth. This gives efficient drainage, and need not occupy more than an inch and a half of the pot. Hard-wooded plants should be potted rather firmly; soft-wooded should be left rather loose and free.

Training and Pruning.—When training is required it should be done neatly and tastefully, using thin and pointed sticks, and very fine fibres of raffia, matting, or soft twine; avoid anything like stiffness or formality, which is the opposite extreme to the graceful habit of plants. The same may be said as to pruning. Cut out such

shoots as interfere with the symmetrical outline of the plant; but more may be done by timely disbudding than by cutting.

Management of Plant Frame for Window Plants.—I have mentioned plant frames as being desirable, if not indispensable, for window gardeners who have the means of growing a variety of plants to stock their windows at all seasons. In the management of plant frames nothing is better for the bottom or floor, in spite of all that has been said against it, than finely sifted coal ashes. The ashes should be firmly trodden down and made perfectly level. So treated, it never gets sloppy, but absorbs all surplus water—a great consideration. Worms or slugs also dislike crawling through or over it. A plant frame generally has short legs projecting below the boarding: these should be sunk in the ground to keep it steady.

The glass should be kept clean, and there should be room sufficient to admit of drawing the lights off at the back.

WINDOW GARDENING, PLANTS AND SHRUBS SUITABLE FOR.

To dwell singly on every genus of plants that is suited for window culture is impracticable, and the best thing that can be done to afford the greatest amount of assistance to the window gardener in the smallest possible compass is to give a tabular view of some of the plants that are most eligible, showing at a glance a list of the plants themselves, the aspect for which they are best suited, the time during which they are in flower, and any brief cultural observations that may appear necessary. The letters N., S., E., W., denote north, south, east, and west aspects.

PLANT.	ASPECT.	WHEN IN FLOWER.	CULTURAL NOTES.
Abutilon, var. "Boule de Neige" ...	S.	Sep.—Dec.	Raise from seed; soil—loam and peat with sand.
Acacia lophanta—tree ...	S.	"	Soil—maiden loam, sand, and peat, well drained.
Achimenes longiflora and alba ...	S.	June—Aug.	Plant corms in Feb., in leaf mould and sand.
Ageratum, any variety ...	S.	June—Sep.	Soil—maiden loam, leaf mould, and sand, well drained.
Alyssum saxatile ...	S.	April—June	Use light, sandy soil. Useful for rock-work.
Anemone coronata and hortensis ...	S.E.W.	Mar.—May	Plant tubers in sandy loam, in October.
Arabis alpina ...	S.	Feb.—April	Hardy; use common soil; useful for window sill.
Arbor vitae (<i>Thuja</i>)—shrub	N.	"	Hardy evergreen; moist soil; from seed or by cuttings.
Aster ...	S.	Sep.—Oct.	Sow seed in March, in loam, light and rich.
Arum Lily ...	S.E.W.	Jan.—April	Sub-aquatic; requires much water; sandy peat and loam.
Aubrieta Graeca ...	S.	April—May	Divide roots in autumn; use good sandy loam.
Aucuba—shrub ...	N.	"	Common soil; from cuttings in spring and autumn.
Auricula, Alpine and show varieties ...	N.E.W.	Mar.—April	Drain well, seed or offsets, in rich sandy compost.
Balsam ...	S.	July—Sep.	From seed; pot in rich light mould, from old hotbed.
Begonia rex and other var.	S.E.W.	July—Sep.	Shoots from tuberous plants, in leaf mould, loam, and peat.
Box—shrub; golden leaved variety ...	N.E.W.	"	Division of roots and layers, in good sandy loam.
Cactus, several varieties; (Rat-tailed Cactus flowers well) ...	S.	June—July.	Loam, peat, sand, and brick rubbish, well drained; water in summer, but not in winter; offsets and cuttings.
Calceolaria—shrubby and herb ...	S.	June—Sep.	Shrub, from side shoots, in Sep.; herb, from seed in May.

WINDOW GARDENING.

PLANT.	ASPECT.	WHEN IN FLOWER.	CULTURAL NOTES.
<i>Camellia</i>	E. W.	June—Sep.	Place in open air after flowering until October.
<i>Campanula</i> , many varieties	S.E.W.		Loam and old manure from hotbed ; drain well.
<i>Candytuft</i>	S.	April—July	From seeds sown in Jan. in compost of peat and loam.
<i>Carnations</i> , all varieties ...	S.	June—Aug.	Good loam enriched with old manure and some sand.
<i>Centaurea</i>	S.	June—Sep.	From seeds in March, in rich sandy loam.
<i>Clematis</i> , any hardy variety	N.	April—Nov.	Equal parts of peat, sand, and good loam.
<i>Cockscomb</i>	S.	July—Aug.	Seeds in Jan., in compost of leaf mould, peat, and sand.
<i>Collinsia</i>	S.	July—Sep.	Seeds in good loam, sown any time in spring.
<i>Convolvulus major</i> and minor	S.	June—Aug.	Seeds in rich, sandy loam, sown early in spring.
<i>Creeping Jenny</i>	E.W.	June—Sep.	Offshoots ; sandy loam and peat, well drained.
<i>Chionodoxa Lucilise</i> ...	S.	Feb.—Mar.	Hardy dwarf bulb ; plant in autumn in common soil.
<i>Chrysanthemum</i> , all var.	N.S.E.W.	Oct.—Dec.	From cutting in early spring ; set in good soil.
<i>Crocus</i> , various colours	S.E.W.	Feb.—Mar.	Plant corms deeply in light soil in Oct. or Nov.
<i>Cyclamen Persicum</i> ...	S.E.W.	Nov.—Feb.	Repot corms in Aug. in light, rich, peaty soil.
<i>Cineraria</i>	S.	Feb.—Apr.	Sow under glass in rich, light soil from May to Aug.
<i>Daffodils</i> , various ...	S.E.W.	Feb.—May	Bulbs planted in light, rich soil from Oct. to Dec.
<i>Dahlia</i> , dwarf varieties	S.	Aug.—Oct.	Division of roots and cuttings in rich sandy loam.
<i>Daisy</i>	S.E.W.	Mar.—June	Plant double varieties in good rich loam.
<i>Daphne Mesereum</i> ...	E.W.	Mar.—April	Will grow in any good ordinary soil.
<i>Dilecta spectabilis</i> ...	S.	Feb.—May	Perennial, grown in compost of mould, peat, and sand.
<i>Dodecatheon Meadia</i> ...	S.	Apr.—May	Division of roots and seeds in good loam, leaf mould, and sand.
<i>Echeveria secunda</i> ...	S.	Aug.—Sep.	Seeds or offsets in good soil ; give little water.
<i>Erysimum Perofskianum</i>	S.E.W.	June—Sep.	Sow in Sep. for early blooms in following year.
<i>Erythronium</i> (Dog's-tooth Violet)	S.	Feb.—April	Tuberous rooted peren. ; peaty soil, well drained.
<i>Euonymus</i> or Spindle Tree	S.E.W.	"	Cuttings or layers in good loam and sand.
Ferns, any hardy or half-hardy variety ...	N.E.W.		Require compost, or maiden loam, sand, and old mortar, drained well.
<i>Forget-me-not</i> (<i>Myosotis</i>) ...	E.W.	May—June	Division of roots in autumn in sandy loam and peat.
<i>Foxglove</i>	S.E.W.	June—Sep.	Seeds in compost of leaf mould, loam, peat, and sand.
<i>Fuchsias</i> , various varieties	S.	June—Oct.	Cuttings in spring and autumn in loam and leaf mould.
<i>Gazania pavonia</i>	S.	July—Aug.	Side shoots in spring or Aug. in peat, sand, and loam.
<i>Genista Cananensis</i> ...	S.	May—July	Will do well and thrive in common loamy soil.
<i>Gentian</i> , various ...	S.E.W.	July—Aug.	Hardy perennials in maiden loam and sand kept moist.
<i>Geraniums</i> , various ...	S.	Mar.—Oct.	Hardy and easily grown in leaf mould, loam, and sand.
<i>Geum coccineum</i> and <i>reptans</i>	E.W.	June—Aug.	Hardy perennials from division of roots in spring.
<i>Guernsey Lily</i> (<i>Nerine</i> <i>Sarniensis</i>)	S.	Sep.—Oct.	{ Compost of equal parts of leaf mould, fine loam, and sand.
<i>Gypsophila repens</i> ...	S.E.W.	July—Aug.	Dwarf trailing perennial ; grows in common soil.
<i>Heaths</i> (<i>Ericas</i>), various	E.W.	Dec.—Mar.	Cuttings in spring in sand under glass ; water well.
<i>Helichrysum</i> (Everlasting Flower)	S.	July—Sep.	Seeds in light sandy loam under bell-glass in Jan.
<i>Heliotrope</i>	S.	June—Sep.	Cuttings in spring or autumn in light, rich soil.
<i>Hepatica</i>	S.E.W.	Feb.—Mar.	Plant tubers in light, sandy soil in Oct.
<i>Holly-tree</i>	N.E.W.	"	Valuable for berries and foliage ; layers in good sandy loam.
<i>Hyacinth</i> , various ...	S.E.W.	Jan.—Mar.	Bulbs ; light soil in pots, or water in glasses.
<i>Hydrangea</i>	S.E.W.	June—Aug.	Cuttings in sandy loam ; when in flower water freely.
<i>India Rubber Plant</i> (<i>Ficus</i> <i>elastica</i>)	N.E.W.	"	Cuttings in sandy peat ; grows well in sandy loam.

WINDOW GARDENING.

221

PLANT.	ASPECT.	WHEN IN FLOWER.	CULTURAL NOTES.
Ivy, many varieties ...	N.	June—Aug.	Grows in common soil in boxes ; require support.
Jessamine, yellow ...	N.E.W.	Nov.—Feb.	Cuttings in light, sandy loam under handglass.
Jonquils ...	S.E.W.	Feb.—May.	Plants from Oct. to Dec. in light, rich mould.
Lachenalias ...	S.	April—May	Bulbs ; place three in pot in rich sandy loam.
Larkspur (<i>Delphinium</i>)	S.E.W.	June—Aug.	Perennials ; division of roots ; annuals from seed in rich loam.
Lavender ...	S.E.W.	Aug.—Sep.	Cuttings in light, sandy loam ; esteemed for fragrance.
Laurestinus—shrub	N.E.W.	Nov.—Feb.	Propagate by layers in good sandy loam in spring.
Lilies, various kinds...	S.E.W.	June—Aug.	Hardy bulbs grown for the most part in sandy peat.
Lily of the Valley (<i>Convallaria majalis</i>) ...	N.E.W.	Feb.—April	Plant in clumps in maiden loam with sand.
Linaria, or Toad Flax	N.S.E.W.		Seed or division of roots in sandy loam and peat.
Lobelia... ...	S.	June " Sep.	Cuttings in light, rich, sandy soil.
London Pride (<i>a Saxifrage</i>)	N.E.W.	April—June	Offsets root readily in common or sandy soil.
Lupines ...	S.E.W.	June—Aug.	Perennials by division of roots ; annuals from seed in March.
Lycopoda, or Club Mosses	N.E.W.		Plant in peat, loam, and sand, and water freely.
Marigold (<i>Calendula</i>)	S.E.W.	July—Sep.	Seeds in sandy loam in Feb. or March.
Mesembryanthemum, var.	S.	June—Aug.	Maiden loam, peat, and sand ; water well in hot weather.
Michaelmas Daisy	S.E.W.	Sep.—Oct.	Division of roots in sandy loam.
Mignonette ...	S.E.W.	June—Aug.	Seeds sown in Mar. in light sandy loam.
Mimulus, or Musk, var.	N.S.E.W.	April—Sep.	Plant in rich loam and peat ; water freely.
Myrtle ...	S.	June—Sep.	Loam and peat mould ; cuttings in sand under glass in Aug.
Narcissus ...	S.E.W.	Feb.—May	Plant from Oct. to Dec. in light rich mould.
Nasturtium (<i>Tropaeolum</i>), various	S.E.W.	July—Oct.	Seeds in light sandy loam ; sow in spring.
Nertera depressa, or Bead Plant...	N.	July—Sep.	Sandy loam ; requires shade and much water at roots.
Oleander (<i>Nerium</i>) ...	S.		Sandy peat, and leaf mould ; requires much water.
Orange... ...	S.	May—June	From pipe sown in spring in rich sandy loam.
Pansy, or Heartsease	N.E.W.	Mar.—June	Seeds and cuttings in autumn in rich sandy loam.
Pelargonium ...	S.	Mar.—Oct.	Seeds or cuttings in autumn ; soil, good rich loam.
Pentstemon procerum	S.	June—Aug.	Evergreen trailer ; grows in good garden mould.
Periwinkle ...	N.S.E.W.	April—June	Division of roots or layers in loose sandy loam.
Petunia ...	S.	June—Sep.	Seedlings and cuttings ; soil, good loam and leaf mould.
Phloxes, various ...	S.W.	June—Oct.	Division of roots ; plant in light rich soil.
Picotees and Pinks	S.E.W.	June—Aug.	Pipings and layers ; new varieties by sowing seeds.
Polemonium reptans	E.W.	April—May	Hardy trailing plant ; requires good garden soil.
Polyanthus ...	S.E.W.	Mar.—June	Division of roots in Aug. in good rich loam.
Primroses and Primulas, various	S.E.W.	Nov.—June	Division of roots or seeds ; soil, good rich loam.
Pyrethrum ...	S.E.W.	June—Aug.	Cuttings in light sandy loam, or from seeds in Jan.
Ranunculus ...	S.E.W.	April—May	Plant tubers in well manured and rich loamy soil.
Rhododendrons, small var.	N.E.W.	April—June	Sandy peat or sandy fibry loam with clayey loam.
Roses, climbing and small varieties	S.E.W.	June—Oct.	Soil, two-thirds rich sandy loam, one-third leaf mould.
Saxifrage ...	N.S.E.W.	May—July	Seeds and divisions in spring ; sandy loam and leaf mould.
Scabius	S.E.W.	June—Oct.	Division of roots or seeds in good rich loam.
Scarborough Lily (<i>Vallisneria</i> sparsa)	S.	Sep.—Oct.	Plant in sandy peat or in good, rich, light mould.
Scilla, or Squill	S.E.W.	April—July	From seeds ; plant bulbs in rich sandy loam.
Sedum, or Stonecrop	N.S.E.W.	June—Aug.	Divisions and cuttings ; dry sandy, loamy soil.
Sempervivum, or House Leek ...	E.W.	June—July	Divisions and cuttings ; dry sandy soil or sandy loam.
Silene, or Catchfly, ...	E.W.	June—July	Seeds, division of roots and cuttings ; requires rich sandy loam.
Snapdragon (<i>Antirrhinum</i>)	S.E.W.	July—Oct.	Seeds or cuttings ; in dry soil or a sandy loam.
Snowdrop, large and small	S.E.W.	Jan.—Feb.	Plant in Oct. or Nov. in light rich soil, loam and leaf mould.

WINTER CHERRY—XANTHORHIZA.

PLANT.	ASPECT	WHEN IN FLOWERS	CULTURAL NOTES.
Solidanella	E.W.	April—May	Seeds and division in spring ; plant in peat and loam.
Southernwood—shrub ...	N.		Cuttings or division of roots in light sandy loam.
Spanish Broom (<i>Spartium</i>)	N.	July—Aug.	Seeds or cuttings in summer ; any ordinary garden soil.
Speedwell	S.E.W.	Mar.—May	Division in spring or seeds ; good garden soil.
Spergula ...	E.W.	May—June	Division of roots in good, light garden soil.
Spiderwort (<i>Tradescantia</i>)	E.W.	June—Sep.	Division of roots in light rich mould.
Stock	S.E.W.	June—Aug.	Seeds sown in Aug. and Sep. in sand, peat, and leaf mould.
Sweet Peas	S.E.W.	June—Sep.	Sow seeds in March using good maiden mould.
Sweet Sultan ...		June—Sep.	Cuttings ; or seeds in light sandy loam in spring.
	S.E.W.	Mar.—Oct.	Seeds, division of roots, or cuttings in spring in light rich soil.
Tulips	S.E.W.	April—May	Plant bulbs in Oct. or Nov. in rich sandy loam.
Verbena, various colours ...	S.	July—Aug.	Seeds, divisions, layers, and cuttings in rich sandy loam.
Verbena, lemon scented ...	S.	June—Sep.	Cuttings in spring ; soil, rich, well-dressed sandy mould.
Veronica incana ...	S.W.	May—June	Division in spring : requires good garden soil.
Violas, or Violets ...	N.E.W.	Nov.—June	Seeds, divisions and cuttings in light rich soil.
Wallflowers	S.E.W.	Mar.—Sep.	Seeds in light sandy loam ; double varieties by cuttings.

It must not be supposed that these are the only plants suitable for window gardening ; there are others but in the above it has only been sought to furnish a good representative list of plants from which selections may be made.

WINTER CHERRY.

This is a hardy perennial, which will grow under shade anywhere. The fruit is *folia*, so called from its yellow root. It is very pretty and much used for winter decoration ; it is largely grown for the mon garden soil, and may be increased by bouquet-makers in Covent Garden.

WISTARIA.

A genus of hardy climbing deciduous plants, which grow freely and are highly ornamental on a house or wall, both for its foliage, which somewhat resembles that of the ash, and its long racemes of purple or white flowers, which in form are very like the blossoms of the laburnum. They thrive in any good garden soil, and are best propagated by layers put down in June or July, which will be found to be rooted and removable the following year in the spring. The best known is *Wistaria Sinensis*, of which there are three or four varieties, one having double flowers, and another variegated foliage.

XANTHORHI'ZA.

An American shrub, *Xanthorluza apicata*, perfectly hardy, and will grow in any common garden soil, and may be increased by



XANTHORHIZA.

suckers. It bears racemes of small dark purple flowers.

XERANTHEMUM.

A showy class of Everlastings, better known as "Immortelles"; the flowers of which, when gathered young, are valuable for winter bouquets. They require a



YUCCA FILAMENTOSA.

rich soil. The best known are *Xeranthemum annuum*, an annual bearing purple flowers, and *X. inapertum*, with white flowers. They are all hardy. See *Helichrysum*.

YUCCA.

Yuccas are popularly known as Adam's Needle. They are perfectly hardy plants, of quaint appearance, forming striking objects in garden scenery. *Yucca gloriosa recurvifolia* has graceful drooping leaves, and forms a most desirable plant for vases, or for planting as a specimen on lawns or in the parterre. Yuccas grow best in a dry but rich sandy loam, and will succeed well if planted on rock-work, to which they impart quite a tropical aspect. They are propagated by division of the root, or by pieces of the root placed in sandy soil in heat. *Y. filamentosa*, or Silk Grass, and *Y. f. flaccida* are desirable varieties. The flowers are white, tinged with green.

ZAUSCHNERIA.

A very handsome Californian perennial plant, in bloom from June to October, with a profusion of beautiful tube-shaped flowers. It succeeds best in dry gravelly soil, and is most easily propagated by division of the roots or by seeds, sown in heat in spring.

ZIE'RIA.

A remarkably pretty greenhouse evergreen shrub. It succeeds best in a mixture of sandy loam and peat, and is propagated by cuttings placed in sand and struck in heat. There are not many species, and it is only necessary to name one of them, namely, *Zieria Smithii*, with white flowers, also called Sandfly Bush and Tasmanian Stinkweed.

ZIN'NIA.

A grand genus of autumn-flowering half-hardy annuals, combining the greatest richness and diversity of colour with unequalled profusion and duration of bloom.



ZAUSCHNERIA CALIFORNICA.

The best known are *Zinnia elegans* with flowers of various colours, white, buff, scarlet, rose, lilac, bronze, violet, and crimson, and its varieties *Z. coccinea* scarlet; *Z. flore-pleno*, with double flowers,

ZIZYPHUS.

and *Z. violacea*, purplish-violet. The seed richest soil and the warmest situation should be sown early in March, so as to possible. For flower beds, borders, and conservatory decoration, the zinnia is alike valuable.



DOUBLE ZINNIA.

have strong stocky plants to put out in June ; they should be planted in the thorns that was placed on our Saviour's head when He was crucified was made.

ZIZYPHUS.

Pretty fruit-bearing greenhouse evergreen shrubs, with extremely graceful foliage. They succeed best in sandy peat and loam. and are propagated by cuttings of ripened wood struck under glass, or by root buds in pieces of the root. *Zizyphus Jujuba*, or the Jujube-tree, is one of the best-known greenhouse species, and *Z. vulgaris* of the hardy shrubs. *Z. spina Christi* may be named, as it is supposed to have been the shrub from whose branches the crown of

PART III.

VEGETABLES : THEIR CULTURE AND MANAGEMENT.

TO enjoy vegetables in perfection it is desirable to gather them from the garden shortly before they are cooked, if cooking be necessary, or eaten in an uncooked state, as is the case with cucumbers, lettuce, and all salading. Of course, reference is now being made to green vegetables, such as the cabbage tribe and the unmatured seeds of all leguminous plants, such as peas and beans of all kinds, and not to tubers or roots, which, generally speaking, must be taken up and stored for use, such as potatoes, parsnips, carrots, &c., because these, chiefly in the case of the potato, suffer injury from frost, and under certain conditions of temperature and weather, could not be conveniently lifted from the soil. Every one knows this who realises the sweetness and succulence of freshly gathered vegetables after having been compelled to draw his supplies from the stock of the greengrocer, which is too often heated by piling together in masses, and by exposure, either in the window or by the door or before the shop front, to the drying action of sun or wind, or both of these deteriorating influences, as the case may be.

It is this marked contrast between vegetables as supplied by the greengrocer and vegetables as grown in the garden ground at the raiser's command which renders the kitchen-garden so desirable, and the culture of vegetables so important a branch of gardening. Try a large, coarse cabbage grown in the fields, and taken from the centre of a great pile of cabbages after its arrival at Covent Garden Market, and then taste a delicate, well-flavoured cabbage just brought in from the garden about an hour before it is wanted for table, and note the difference. Any one who does so will never partake of the former again, except through necessity arising from inability to get any other, and on account of the delicious flavour and freshness of the latter, will ever after set store by his garden ground, whether large or small, and do his best to learn how to grow vegetables of all kinds in the best possible manner and to the best advantage.

To do this the would-be gardener has merely to study with attention the pages that now follow, supplementing the knowledge that he cannot fail to gather from them with the experience that he will gain as years go on. As in the case of flowers, the manipulation of the ground and the modes and means of preparing it for the growth of vegetables by digging, trenching, dressing, hoeing, watering, &c., has been duly discussed in Part I., but the vegetables themselves, their classification in various ways, their varieties, and the special treatment that each requires has yet to be considered, and

INTRODUCTORY.

has to be gathered from the special account given of each in its progress from seed-sowing to maturity. And he must also get some idea of the varieties of each vegetable, which in some cases, and more especially with regard to peas and potatoes, are ever coming and going by reason of the introduction of new sorts, the new-comers, if of undoubted excellence, taking the place of some of those of previous introduction, which are not accounted to be as prolific in yield or so tasteful in flavour. Who now remembers the Early Red, the Late Red, and the Golden Pink-eye—potatoes of half a century ago—excellent sorts worn out and destroyed in the potato famine of 1848, and Knight's Green Marrow and Scimetar peas found and grown in all gardens of any pretensions of that period? Who bears in mind, indeed, many peas and potatoes of even twenty years ago or less, fallen into disregard through introductions of modern times in the shape of William Hurst, William I., Daisy, Daniel O'Rourke, and many others among our peas of to-day, and Beauty of Hebron, Schoolmaster, Imperator, and White Elephant among potatoes. And these are but a few names out of many that could be cited.

All that is necessary to know respecting the culture of vegetables, their sorts and varieties, the seasons for sowing, and times for transplanting, the soil desirable for each, and any special mode of treatment that may be necessary in special cases, are all described in detail in the pages that immediately follow; the vegetables themselves, as in the Part devoted to the culture of flowers, being taken in alphabetical order, the reader may obtain quick and ready access to any information of which he may be in need, with reference to the culture of vegetables of any and every kind.

The amateur gardener, unless he have a considerable extent of ground, should not attempt to grow all kinds of vegetables, but confine himself to those that are most useful and the most profitable. To this end it is desirable, either in October or early in November, to make a plan of the garden showing the successional cropping throughout the coming year, and the portions of the ground to be devoted to each kind of vegetable that is grown. In large gardens anything may be done, and any kind of vegetable that is liked may be sown and grown; but in small gardens devoted to the culture of vegetables the *Brassica*, or cabbage tribe, should predominate, care being taken to provide a good breadth of succulent spring or summer cabbage, and Savoys, and Scotch kale for winter use, both of which cannot be regarded as being at their best until they have been rendered tender by exposure to the frost. A few rows of peas, beans, and, above all, runner beans should not be omitted, with a plentiful supply of lettuce for summer use. If space permits, good breadths of carrots, parsnips, beetroot, onions, and turnips should be sown, and a corner reserved for vegetable marrows, which admit readily of training against a fence. Some radishes and a few rows of early potatoes completes the list.

ALEXANDERS.

This herb, sometimes called Alisander, was once much cultivated in the same way as celery, and used for the same purpose. Sow on a light rich soil during April and May in drills about 2 ft. 6 in. apart. Thin out the plants when large enough, leaving about 1 ft. between those allowed to remain. When about 1 ft. in height earth up, so as to blanch like celery.

The scientific or botanical name of this plant is *Smyrnium olusatrum*. It is found wild on the cliffs along the sea coast in some parts, where it flowers in June and July. It finds a place among the medicinal plants of the old herbals, the seeds as well as a decoction of its long thick and acrid root having the reputation of warming, strengthening, and comforting the stomach. The stalks of the leaves were used in scorbutic complaints.

GLOBE ARTICHOKE.

A plant that is grown wholly and solely for its flower heads, which are eaten before they come into bloom. There are two varieties used for garden purposes, distinguished as the Green and the Purple.



LARGE GREEN PARIS ARTICHOKE.

It is best propagated by offsets taken in March. The plants bear best the second or third year after planting; so that it is advisable to plant one or more rows every year, and remove the same quantity of old roots. The ground should be deeply

worked and well manured: let the manure be incorporated with the soil, not laid in a mass at the bottom of each trench. It is better to trench the ground first, and fork the manure well into the surface-spit, which gives the plants a better chance of immediately profiting by it. The offsets may be dissevered with a knife, or slipped off and cut smooth afterwards, and planted with



EARLY PURPLE ARTICHOKE.

a dibber. Some plant in threes, a yard apart, and 4 feet from row to row; or they may be planted singly, 2 feet apart in the row, and from 3 to 4 feet from row to row. They should be well watered, and the ground kept loose between.

Salt, when used as a manure, is beneficial for globe artichokes. If grown on stiff land the soil should be lightened by plentiful dressings of sand or road grit.

JERUSALEM ARTICHOKE.

This is a hardy and profitable vegetable, excellent for culinary purposes, and requiring no protection in winter. It likes a light, rich soil, and the ground should be well dug over, and if at all heavy or poor should be lightened by incorporating some sand with it and enriched with well-rotted manure. For planting, small tubers should be chosen, and, indeed, reserved for this purpose when the crop is taken up. These should be set in rows, 3 feet apart, and at a distance of 1 foot from each other in the rows; they should, moreover, be set 6 inches deep. The ground should be kept clean by hoeing, and as the plants

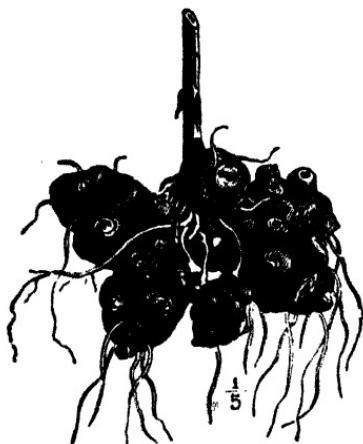
ASPARAGUS.

height a little earth should be drawn up round the stem. The tubers may be left in the ground till wanted for use, or they may be taken up towards the end of November and stored in sand or earth, but they must be covered so that the light and air may be effectually excluded, otherwise they will be of a dark colour when cooked. Those who are fond of this vegetable should make trial of the white-skinned variety, known as the "New White Mammoth," the tubers of which have a clean white skin instead of the purplish-red tint of the old

desirable to change the ground allotted to their culture about once in three years, for when they are permitted to remain too long on the same spot the tubers deteriorate in size and quality.

ASPARAGUS.

Sowing Seed.—This delicious vegetable is a general favourite; but it is more costly than ordinary vegetables, and for this reason is never greatly in demand. To raise asparagus from seed, which it yields in abundance, if allowed, in the autumn, the seed should be gathered when fully ripe, hung up to dry, and rubbed out when sufficiently so. It may be sown thinly on ground that has been well dug, but not manured, any time from the beginning of March to June. If sown broadcast, it should be scattered thinly and evenly, and



JERUSALEM ARTICHOKE.



ASPARAGUS.

variety. They are rounder in shape and not so irregular in form as the tubers of the red sort. The new white variety is perfectly hardy, and in no way liable to injury from frost.

Jerusalem artichokes afford a useful screen for a wooden fence when planted along the foot of it. When once planted, the difficulty is to get the ground clear of them again, for the smallest tuber will grow. To obviate this as far as possible, it is desirable to endeavour to leave no tubers in the ground when digging the crop. It is

trodden in, and the ground raked over; if in drills, they should be about a foot apart and an inch deep, the seeds sown thinly, and pressed and raked over. The plants make more root than top the first year; but if they are kept clear of weeds, and the ground stirred often between them, they will grow vigorously the second year, and be fit to plant out the following spring. Beds of asparagus may be made as late as September.

Another practice strongly recommended by some cultivators is to sow asparagus

seeds at once on the beds where they are to grow. This needs deep trenching and heavy manuring. The beds thus prepared, a line is drawn in the 4-foot beds a foot from each edge, and a foot apart. Upon these lines, at every 12 inches, a few seeds are planted about an inch deep. When the seedlings come up, thin out, leaving only one of the most vigorous plants. A bed thus sown, and carefully weeded and manured, and the surface stirred in autumn and spring, will produce buds in the fourth year, and fine large plants in the fifth year, and will continue to bear for twelve or fourteen years.

Making Plantations.—At whatever time it may be determined to make plantations of this vegetable, they should be made on a rich soil, neither wet nor too stiff, but pulverising readily under the spade. On this soil a coating of rich well-rotted stable manure, three or four inches thick, should be spread, after which the ground should be trenched three spades deep, the manure being buried pretty equally at the bottom spit of each trench. The ground being dug and levelled, divide it into 4-foot beds, with alleys two feet wide between each bed.

Planting.—Select strong one-year-old plants without tops, and plant them two rows in each 4-foot bed, the rows a foot from each side of the bed, and the plants a foot apart in the rows. The method of planting is as follows:—Strain the garden-line longitudinally along the beds, a foot from the edge; then with a spade cut out a small trench or drill verticle to the line, six inches deep. In this trench set the plants upright against the vertical side, so that the crown of the plant stands upright, and two or three inches below the surface of the ground, spreading out the roots against the back of the trench, and drawing a little earth round the roots with the hand to steady them. When the whole row is planted, with a rake draw

the earth into the trench, round the roots of the plants; then proceed with the next row in the same manner.

Management after Planting.—As a plantation of asparagus only comes into bearing the third year, it is sometimes customary to sow a thin crop of onions over the beds at the time of planting, afterwards raking the surface of the beds smooth. As soon as they begin to grow, give a good watering with salt-and-water, about the strength of sea-water; then keep the bed clear of weeds, pulling up all onions, or other surface crops, where they come up close to the plants, and the new beds will suffer no injury.

Spring Digging and Dressing.—Established beds of asparagus require top dressing every spring, and March is the best month for the purpose. This is done by digging in with a three-pronged fork, with short flat tines, a spring dressing of well-rotted manure, which has been laid on the beds in the previous autumn, more or less thick, according to the state of the beds, loosening every part to a moderate depth, but avoiding the crowns of the plants. This gives free access to the light and air, and free percolation for the water. Immediately after this dressing, rake the beds smooth and regular before the plants begin to shoot.

CUTTING ASPARAGUS.

This is an operation of some delicacy. It should be cut with a saw-edged knife, having a straight, narrow, tapering blade, about six or eight inches long, and an inch broad at the haft, rounding off at the point. When the shoots are fit to cut, the knife is slipped perpendicularly close to the shoot, cutting, or rather sawing, it off slightly three or four inches below the sur-



ASPARAGUS KNIFE.

face, taking care not to touch any young shoot coming out of the same crown.

FORCING ASPARAGUS.

Asparagus is successfully forced in the frame and melon pit; but the plants are not fit to move before February. The usual plan is to make up a 3-foot bed, and cover it with three inches of loamy soil, before putting on the frame; this allows more space inside. When the frame is on, and the bed of a right temperature, a little soil is put at the back of the frame, in the form of a bank, about six inches high, and sloping to the front. On this bank, place a row of asparagus roots, laying them almost flat, as this admits of covering them, without an undue thickness of soil. When the first roots are laid, cover them with a few inches of soil, and make another bank six inches from the first, on which lay another row of roots; and so proceed till the frame is full. To maintain the temperature of the bed, fresh manure should be piled up all round it on every side.

FRENCH MODE OF GROWING ASPARAGUS.

The French practice is to dig a trench five feet wide and the length of the bed, laying aside the best of the soil for surface use. On the bottom of the trench is laid, first, six inches of rich stable manure; above it, eight inches of turf; again, six inches of well-rotted dung, and then eight inches of the reserved soil sifted; over this six inches of thoroughly decomposed manure, and six inches more of the soil thrown aside in making the trench, well mixed together by digging. The beds thus formed are five feet wide, with alleys between two feet wide. The roots are planted in the beds in rows eighteen inches apart, and eighteen inches apart in the rows; a handful of fine mould is placed under each plant, over which the roots are

carefully spread, the crown being an inch and a half below the surface; a spadeful of fine sand is now thrown over the crown, and the operation is completed. In order to procure an early supply of this delicious vegetable, they first prepare a moderately warm hotbed. On this six inches of rich mould is laid, and a sufficient number of asparagus from an old bed planted. Over this lay a few inches of the same soil, covering the whole with sufficient litter to keep out the frost, or by mats over the frame. The plants will soon start into growth. A little liquid manure applied occasionally will keep up a vigorous growth, and the plants, if properly managed, will be ready to cut by Christmas.

AUBERGINE, OR EGG PLANT.

Several varieties of these half-hardy annuals are eatable, and extensively cultivated in the South of Europe. As pot plants they are curious and interesting, being covered in autumn with beautiful egg-shaped fruit; the scarlet variety is a great novelty. In warm localities they succeed out of doors on a south border.



LONG PURPLE AUBERGINE.

Culture.—Seeds should be sown in gentle heat in April, and the young plants, when large enough, should be pricked out in 4-inch pots, and kept in heat until fully rooted. About the middle of June, after being hardened off gradually, they may be placed out of doors in the place in which they are intended to grow.

BALM.

A sweet-scented hardy herbaceous perennial (*Melissa officinalis*) with ornamental foliage, succeeding in any common garden soil. Propagated by divisions of the roots in March or October. In former times,



owing to the lemon-like flavour of the leaves, it was much used in making a cooling drink, known as balm tea.

BASIL.

The variety known as "Bush Basil" is the most hardy. It is raised from seed sown in gentle heat in March. Thin out,



and give air freely to harden off the plants, which may be removed to a border consisting of light, rich soil, and in a warm situation in May or early in June.

BEANS.

Beans, like peas, can be sown in

November, where the soil is light, well drained, and well sheltered; where the ground is heavy, they may be raised in a pit or frame by sowing three in a 4-inch pot, and planted out in March; but if the soil is cold, and no conveniences are at hand for starting in pots, they may be sown in the following manner:—Let the ground be laid in ridges 3 feet wide, and 15 or 16 inches high, ranging east and west; on the south side of each ridge draw a drill half-way between the top and the bottom, in which sow the beans about three inches apart; by this means they will be above



SEVILLE LONG-POD BEAN.

the wet, catch every ray of sunshine, and will be stronger than if raised under glass and planted out. When about 10 inches high, level the top of each ridge to the row of beans behind it: they will not require earthing up again. If sown in October, a succession may be sown in January, in the same manner; and so on once a month till June; they do not bear well if sown after that. Those sown on level ground should have some earth drawn up to the roots when 3 or 4 inches high; this causes them to emit fresh roots. They are sown in rows about 4 feet apart, which

room for a row of broccoli, spinach, or lettuce between; but those who are not limited as to space had better allow 5 or 6 feet from row to row. On light soils the usual method is to stretch a line along where they have to be sown, and dib holes 4 inches deep, planting a row each side of the line, 4 inches apart, zigzag fashion; but in wet soils it is better to drill them in, laying boards along the row to stand on, so as to avoid clodding the ground by treading on it. The sort usually grown for first crop is the Early Mazagan; but the Early Long-pod is equally early and prolific, and larger; so are the Seville and Giant Long-pod, for maincrop. The Broad Windsor Bean is a well-known and good old variety. But whatever sort is grown, the culture is the same.

BEANS, FRENCH OR KIDNEY.

These beans, which are sometimes distinguished as haricot beans, require a light, rich, loamy soil, and should be planted in an open situation. In out-door culture the seed should not be sown until the middle of April in sunny spots, or in the beginning



FRENCH BEAN, "CANADIAN WONDER."

of May in positions not so open to the sun, and from this time crops may be sown in succession once a fortnight, or thereabouts, until the end of July. Plant in rows from

inches to 2 feet apart, and from 9 to 12 inches apart in the rows. Put at least three seeds in each patch, lest any should

fail; if all grow, two can be removed; if none grow, the deficiency must be supplied by transplanting from a patch sown for the purpose. It is better, however, to sow more plentifully than to transplant, as this operation tends to check the plants. The seed should be dibbled in to the depth of an inch. As the beans grow, draw the soil up round each plant as high as possible.

BEANS, FRENCH OR KIDNEY, FORCED.

When forced, kidney beans may be had at any time of year, whether early or late. They may be grown on a hotbed, but they are better grown in pots, or they are apt to run all to haulm and leaf. In an ordinary hotbed, as if made for cucumbers, place as many 6-inch pots as will stand 15 inches apart. These pots being filled with good loamy soil, in each plant, triangularly, three Canadian Wonder beans, or Daniel's First Early, which are of small dwarf habit and great bearers, and, as they grow, give them regular waterings; but they need not be removed, and the heat should never fall below 60°. They are very susceptible of frost, and will require careful protection from it, in common with all forcing plants. Nothing can be better for covering the lights than hurdles made of lath and straw. If sown in January or February, they will bear in April or May. They sometimes require supporting with sticks.

BEANS, RUNNER.

As Runner Beans grow to a considerable height, they cannot be conveniently forced

effected by constantly pinching off the leading shoots, and thus compelling it to assume and maintain a dwarf, bushy growth. The soil should be light and rich as for peas and other varieties of beans, and the situation sunny and open. Plant double rows 9 inches apart, dibbling in

single seeds to the depth of 2 inches and 9 inches apart in the rows. At least 6 feet should be allowed between each series of double rows. Means for the plants to climb must be afforded by poles stuck in the ground along each row, inclined towards each other till they cross at the top, and secured by tying with tarred cord to horizontal sticks dropped into and along the crossing of the poles in the earth, from end to end of the row. If there is not much room, the seed may be set in single rows, about 3 feet apart, and kept dwarf by

planted in such positions. Those known as Scarlet Runners are so called from the scarlet flowers which they bear. The White Dutch Runners have white blossoms and a third sort, known as Painted Ladies, have scarlet and white blossoms.

BEET, RED.

This vegetable, which is generally known as beetroot, should be sown at the beginning of April, in deep rich ground, fully exposed to the sun, and quite open and away from trees. Sow the seed in shallow drills, 15 inches apart, and drop three or four seeds at intervals of 10 inches or a foot apart, or sow thinly along the drill: cover, tread, thin, and rake the



SCARLET RUNNER BEAN.

pinching the leading shoots. If this style of growing them be adopted, no sticks will be required. Another mode is to place hurdles along the rows, on which the runners may climb to the height of the hurdles.

Runner beans are often sown in a mass, in a pan or box in richly-manured soil, in the middle of April, and kept under shelter until the middle of May, when they are planted out in the garden. By this means the crop may be obtained a little earlier. These beans are often utilised for covering fences, and yield plentifully when sown or



DELL'S CRIMSON BEET.

ground roughly with a wooden rake, drawing off large stones, &c., that may be on the surface. Sowing this seed in drills is preferable to sowing broadcast, because it not only gives greater facility for thinning out and using the hoe between, but it insures a regular crop without wasting the seed, the plants being at regular distances. When the plants are about a foot high, thin them to not less

than a foot apart, leaving the best-coloured rather than the strongest plants; for the better it is, the less likely it is to grow strong and large. Large roots are not esteemed, being deficient in flavour. The roots should be lifted in October, before the frost sets in, for this is injurious to them. In taking them up, care should be taken not to break the tap root, or puncture them in any way, for damage of this kind tends to deprive them of their colour when boiled. When taken up, the leaves should be trimmed off, and the roots kept in sand, so as to be perfectly dry and free from the hurtful influence of wet or damp.

BEET, SPINACH OR WHITE.

The culture of this variety, which is grown for the sake of its leaves and leaf stalks, that are eaten like spinach in autumn and winter, is similar to that of beetroot or red beet, but a second sowing should be made in July or August, to be available for the winter months and spring.

BORECOLE.

Borecole and Curlies are a numerous of *Brassicae*, cultivated for their leaves in winter, and for their sprouts



TALL GREEN CURLLED BORECOLE.

in spring. The first week in April or May, and again about the second week in August, is the time to sow. The borecoles are less exhausting to the soil than

cabbages, and will follow peas without fresh manuring, if the ground is in tolerably good heart; or they may be planted between rows of peas or potatoes, to occupy the ground when these crops are removed.

The varieties of this tribe of *Brassicae*



COTTAGER'S KALE.

are so numerous and so mixed, that the distinction between them is very indefinite. Dwarf Curled Greens, under half a dozen names, are the old Scotch Curly, very dwarf in habit, and closely curled—an excellent variety. The Tall Green Curled, also under a host of names, grow two or three feet high, stand severe frost, and afford the most delicate greens when frosted. Purple, or Sprouting Borecole differs little from the preceding except in colour. Variegated borecole is a mere variety, very useful, and even ornamental, in the mixed gardens. Cottagers' Kale is a variety of the Tall Cavalier Cabbage, which was raised at Sherburn Castle, Oxfordshire, from Brussels sprouts crossed

most tender of all greens, and of exquisite flavour. It stands four feet high when full-grown, and should be allowed an equal space to grow in, being clothed to the

ground with immense rosette-like shoots of a bluish-green tint which, when boiled, become a delicate green. The seed should be sown late in March, or early in April, and, when planted out, should have a deep rich soil assigned to it.

BROCCOLI.

Broccoli is supposed to be a variety of the cauliflower, from which it differs very slightly, the chief points of difference being that the flower-stem is longer and less fleshy, the head less compact, and it rarely attains the size or delicacy of the cauliflower.

Preparation of soil.—all the varieties of broccoli require a deep, rich, loamy soil, and the ground should be trenched to a depth of at least two feet, incorporating, as the work proceeds, abundance of rich manure. Indeed, to obtain fine large heads too much manure can hardly be used.

Time and Manner of Sowing.—The early varieties, such as Purple Cape, Grange's Early White Walcheren, Veitch's Self-protecting Autumn, &c., should be sown from the middle of April to the



PURPLE SPROUTING BROCCOLI.

intended to furnish the spring supply or main crop at the latter end of April or early in May. All the varieties should be sown in beds of well-pulverised rich soil. The surface must be made fine, and the seed then beaten gently into the ground and covered lightly with fine earth. When the plants are sufficiently strong, and before they are drawn by growing too closely together, transplant them into nursery-beds or lines, allowing about four inches intermediate space. This will insure strong stocky plants, and will also induce the formation of an extra quantity of roots. In transplanting the early varieties, great care must be used not to injure the roots; and the plants should be freely supplied with water until fairly established. In warm localities, where the soil is of a light sandy nature, it is considered necessary by many growers to sow the seed in the situation permanently intended for the crop; but we think, if moderate care is taken to keep the plants well supplied with water, they may not only be safely transplanted, but that thus treated they will be much less liable to form heads prematurely.

—Plant in ~~vermous~~



EARLY WHITE BROCCOLI.

middle of May, according to locality, and a second sowing of similar kinds should be made about a fortnight afterwards. These will succeed the cauliflowers, and will carry the supply on to Christmas. Two or three sowings of Snow's Winter White, put in from the beginning of April to the middle

nent situations as soon as the plants are sufficiently strong, in rows from $1\frac{1}{2}$ to 3 feet apart, leaving about the same distance between the plants. Generally it may be said that they should be planted according to the size of the plants. Thus Knight's Dwarf require only 18 inches, Early White 27 inches, Purple Cape, Walcheren, and White Sprouting, 2 feet; and the taller sorts should be 3 feet apart. Keep them well supplied with water until fairly established, especially the autumn flowering varieties, and these must also be liberally watered in all stages of their growth, during dry, hot weather. Keep the ground well stirred between the rows and free from weeds; and before severe weather sets in, the spring kinds should be laid over, with their heads facing the north. This operation checks the action of the roots, and the plants consequently become less succulent and better able to resist frost. They are thus also put in the best possible position for covering with stable or any other litter when such protection may be necessary.

There are many varieties of broccoli—too many, indeed, to be mentioned here—and for classification in divisions, with times for sowing and cutting, the reader is referred to the price lists of the leading growers, such, for example, as those issued by Messrs. Daniel Bros., Norwich, Messrs. Sutton and Sons, Reading, &c.

BRUSSELS SPROUTS.

Brussels Sprouts should have the same treatment in the seed-beds as other members of the cabbage tribe (see *Cabbage Tribe, Seed-beds, for*), early in April being the best time for sowing in the open ground. Mr. Cathill thinks March sowing would be better. "When thus sown," he adds, "I have had them three feet high, each stem producing a peck of large close sprouts." The after-treatment Mr. Cathill recom-

mends, is to "select a rich stiff loam, and plant them in rows 2 feet or 18 inches apart, keeping the ground loosened by hoeing; and as soon as the stems reach their full height, which is known by the top beginning to cabbage, it is cut. This throws all the strength of the plant into



BRUSSELS SPROUTS.

the sprouts on the stem, and makes the bottom ones as good as the top." Mr. McIntosh dissents from this practice of cutting the top: "From their form and position," he says, "they protect the sprouts during winter, and in wet weather, from frost, snow, and rain."

CABBAGE.

The *Brassica*, or *Cabbages*, are the most important product of the garden, whether we look at them as a necessary or a luxury of life. They are also, except under a well-considered system of rotation cropping, the most exhaustive class of vegetables under the gardener's care.

The principle cabbages now cultivated in this country are the Early Battersea, Early Dwarf, Early York, Imperial Penton, Sugarloaf, Drumhead, Red Dutch, Purple Turnip, Savoy, Green Savoy, and Yellow Savoy, and the numberless varieties which have sprung from them.

Classification.—This important family of vegetables is biennial, triennial and nearly perennial in some of the varieties. It may be divided into—

1. Cabbages proper, which have heads formed of the inner leaves growing close and compactly round the stem, which are thus blanched into a whitish yellow by the outer leaves.

2. Red, or Milan Cabbage, which grows in the same form, but differs in colour.

3. Savoys, distinguished by their curly wrinkled leaves, but retaining the tendency to form a head.

4. Brussel Sprouts, producing the sprouts, or edible part, from the stem in small heads, like very young cabbages.

5. Borecole, of which there are many varieties, having a large open head with large curling leaves.



DRUMHEAD CABBAGE.

6. Cauliflower and Broccoli, in which the flower-buds form a close fleshy head of a delicate yellowish white, for which both are cultivated.

Cabbage Proper, the.—Of the first of these there are many varieties, some of them valuable for their precocity, which adapts them for early spring cultivation; others for more enduring qualities. They are all propagated by seed sown for main crops twice a year—namely, in April, for planting out in June and July, for autumn and winter use; and in August and September, for spring use; but it is usual to make sowings of smaller quantities every month for succession.

Cultivation, Soil, &c.—The seed is

sown on beds four feet wide, and long in proportion to the sowing. A bed 4 feet by 20 will take 2 oz. of seed. Cover the seed to a eighth or a quarter of an inch with rich light soil, and rake it in: the after-cultivation will be gathered from the monthly calendars. The cabbage requires a rich retentive soil, and is improved by early transplanting. When about two inches in height, the young plants should be removed into nursery-beds thoroughly prepared by digging and manuring, and, if dry, by watering, where they are planted four or five inches apart. Here they must remain till well rooted. Their next remove is usually to the place where they are permanently to grow; but they will be rather improved than otherwise by an intermediate shift to a second nursery-bed.

Planting Out.—In final planting out, the ground being trenched and well manured, a drill is drawn three inches deep, at a distance proportioned to the size and habit of growth of the variety; the small or early dwarfs at 12 or 15 inches apart in the rows, the larger sorts at 18 inches. The subsequent culture is confined to weeding and occasionally stirring the earth during summer, and drawing it up round the stem when about eight or nine inches high.

RED OR MILAN CABBAGE.

The red cabbage is chiefly used for pickling. Its cultivation is in all respects the same as the white cabbage, and the vegetable is only gathered when the head is thoroughly formed, and when so gathered the stem is thrown away as of no further value.

SAVOY CABBAGE.

This has been in cultivation in this country since the times of Gerarde (1545-1607), by whom it is described. It is distinguished by its curly leaves and deep green colour from the cabbage;

like it, however, it grows a compact, well-shaped head, and a plentiful crop of sprouts on the stem during winter. Like the others, it is propagated by seeds and cuttings in the spring, sown on a hotbed in February, or on beds in the open ground early in April. Plants will be ready for planting out permanently in May, June, and July.



Cultivation, &c.—In all respects the treatment is the same as with cabbages, removing the plants to a nursery bed when 2 inches high, selecting the strongest plants first. When planted out permanently, they should stand 2 feet apart in the rows and 20 inches between the plants; but it is not unusual to plant them between standing crops of peas or other less permanent crops, whose place they thus occupy when removed.*

SEED BED FOR CABBAGE TRIBE.

For all varieties of the cabbage the treatment is very nearly the same, and as the directions now to follow will be useful for small seeds generally it will be well to give it, although special instructions for each particular class or variety are given under the special name of each different sort. Let the seed beds be open and away from trees and other shelter, and tolerably dry, but not parched, at the time of sowing. Mark out for each sort its allotted space; give plenty of room—at least a square rod;

the seed broadcast regularly over the ground, so that they do not come up

thicker in one part than another; tread it well in, unless the ground is wet and binding; in that case stand in the alleys, rake level, and pat the surface with a piece of flat board: this will press the seed in without hardening the ground. If dry enough to tread, rake the surface even. If the weather is dry, and continue so, it will be necessary to give the seed bed a copious watering to keep it moist, so that the surface does not cake. When the seed is up, keep the beds moist, so as to promote vigorous growth; giving a liberal dusting of lime, salt, or soot now and then, which will benefit the young plants, and prevent the attacks of the fly. When large enough to handle, thin them, and prick out those drawn in nursery beds five or six inches apart from each other.

CAPSICUMS.

Pretty ornamental plants, especially in autumn, when covered with their light scarlet fruit. From the capsicum cayenne pepper is made.

Preparation of the Soil.—These thrive best in a rich, yet light and free soil; and whether grown in pots or planted out, the soil should be of this description.

Time and Manner of Sowing.—The seed should be sown early in March, in well-drained pots filled with light sandy soil, and placed in a cucumber-frame, or wherever a temperature of about 65° is maintained. Cover the seed to the depth of about half an inch, and keep the surface constantly moist until the plants appear. When the plants are strong enough to handle, pot them off, placing two or three plants in a 5-inch pot, and replacing them in the warmth. Keep them rather close until they become established, then shift into 7-inch pots; and when they are fairly established in these, remove them, if intended for the open ground, to a cold frame, and gradu-

ally prepare them for planting out by a freer exposure to the air. Those intended to grow in pots under glass should be shifted into 10-inch pots as soon as



CAPSICUM (*var. GOLDEN DAWN*).

they require more space for their roots, and be stopped, so as to cause them to form bushy plants; they must be liberally watered and syringed over head during very dry weather. Those intended for the open garden may be planted in properly prepared situations towards the end of May, protecting them by hand-glasses or any more convenient contrivance till they are fairly established. They must be liberally watered during hot, dry weather. In favoured localities most of the varieties do better planted out than when grown in pots under glass; but they will not succeed in the open air except in warm, dry situations.

CARDOONS.

A perennial in its native country,—the shores of the Mediterranean,—it becomes an annual in this country, the first sowing taking place in the beginning of March, on a very slight hotbed; in April, on the natural ground; and again in June, for next spring's crop. The trenches are dug as for celery, and moderately manured with well-decomposed dung. In sowing, two or three seeds are sown

together in a clump, 12 inches apart. Should each vegetate, remove all but one, when six inches high. When the plant is 18 inches high, put a stake to it, and tie the leaves lightly to it, earthing-up the stem at the same time, like celery. Throughout the summer water copiously and frequently with soft water and a little guano, to prevent flowering. In September, the early crop will be fit for use; remove the earth carefully, take the plant up by the roots, which cut off; the points of the leaves also cut off to where they are solid and blanched. These are carefully washed, the parts of the leaf stalks left tied to the stem,

EARLY HORN CARROTS.

Early carrots may be grown in the same manner as radishes: a bed 2 or 3 feet high, about 10 inches of soil, which should be perfectly sweet, and free from the larvæ of insects; a bushel of pounded chalk mixed with it will be advantageous; the Early Horn being the best for ——



CARDOON.

culture; but, as the seed is very light, and hangs together, it requires, for the purpose of separating it, to be rubbed up in a peck or so of tolerably dry soil, which will help

CARROTS—CAULIFLOWER.

to bury it when sown, using the rake to press it in. When up, and sufficiently large to handle, the plants should be



TYPE OF EARLY HORN OR SHORT CARROT

thinned to 2 inches apart, and plenty of air given, or they will be drawn all to top.

SOWING CARROTS.

Those who know the sweetness and delicacy of the Early Horn kinds, in their young state, will take care to have a constant supply of them. There are many different sorts of carrots, as may be seen on reference to the price lists of the growers, but the Early Horn is generally used for forcing and early crops, James's Intermediate for second or late crop, and the improved Altringham for main crop; but much depends on soil and locality. They may be sown in frames in gentle heat in January, and in borders from March till the latter end of July. The main crop may be sown from the middle of March to the middle of April, according to situation.

Sow broadcast on beds, and thin Early Horns to three or four inches for the smaller sorts; larger sorts are better sown in drills. If it is preferred to drill the seeds, let the drills be twelve or fifteen inches apart, as shallow as possible, and sow the seed continuously along the drill, or three or four seeds at intervals of six or

eight inches; this economises the seed, and admits of going amongst the plants without treading on them. Light ground should be trodden before it is drilled: the seed hangs together, and should be separated by rubbing it up with soil, if sown broadcast; but this is unnecessary if sown in drills. The seed is very light, so that a calm day should be chosen for sowing: a little wind is apt to blow it anywhere but into the right place; it takes from one to three weeks to germinate.

TYPE OF LONG CAR.
NOT FOR LATE OR
MAIN CROP.

main crop for storing should not be taken up till quite the end of October, or even later, unless severe frosts set in.

CAULIFLOWER.

In all varieties of the *Brassicae*, except broccoli and cauliflower, we find them cultivated for their leaves, growing either loosely on the stem, or forming a round compact head, blanched by being covered with the outer leaves, or sprouting from the stem, sometimes in small heads, at others in separate small slender leaves. In the broccoli and cauliflower, however, the abortive flowers form a sessile corymb, connected with the stem by a thick, fleshy peduncle, the whole thickly interwoven, and forming a compact round head of a

creamy white colour, and of great delicacy when properly grown. There are many varieties now in use which may be ascertained on reference to the price lists of the principal growers.

Sowing, &c.—With us the plant is treated as an annual, although it may, like all the race, be propagated from cuttings. In order to keep up a succession, three or four sowings should be made in the season, the first sowing being made on a slight hotbed in February, or very early in March. This is done by digging away a few inches of the soil the size of the intended bed, filling it up to a few inches

wide, and long in proportion to the requirements of the garden, half an ounce of seed being sufficient for a 10-foot bed. In very dry weather the seed-beds should receive a copious watering the night before sowing. When the plants are large enough to be handled, transplant them to nursery-beds of rich soil, well manured, pricking them out four inches apart each way. Some authorities recommend a second removal when the roots have formed a compact mass, in order to check the growth of stem and promote balling. In June the April sowings will be fit to plant out where they are to grow; in September they will be heading, and will continue to improve up to the frosts of early winter.

Like all the Brassicas, the cauliflower requires a rich, deep soil, and an open spot, but sheltered from the north.

The after-cultivation is very simple; careful weeding, stirring the soil from time to time with the hoe, and drawing the earth about their roots, and copious watering at the roots in dry weather, include the necessary routine.

CAULIFLOWER, AUTUMN SOWN, TREATMENT OF.

above the surrounding soil with fresh stable-dung which has been well turned, covering the bed with the soil removed, raking it, and patting it smooth with the back of the spade. On this bed sow the seed, raking it in, or sifting fine soil over it, and covering it with hand-glasses, and otherwise protecting it when necessary. Early in April a second and larger sowing should be made in the open ground, and a third and last sowing about the middle of August to stand through the winter.

Cultivation, Transplanting, &c.—All sowings should be made on beds of rich light soil, thoroughly pulverised by digging, and neither too dry nor too moist, $\frac{4}{5}$ feet

pricked out under frames for protection during winter, keeping them clear of weeds and decaying leaves, stirring the soil occasionally, and giving plenty of air in fine weather, protecting them from frost and rain. As they advance, and begin to head under hand or bell-glasses, every opportunity should be taken of giving air; in severe weather protect the frames and hand-glasses by packing litter round them.

When the heads begin to appear, shade them from sun and rain by breaking down some of the larger leaves, so as to cover them. Water in dry weather, previously forming the earth into a basin round the



CAULIFLOWER.

stem, and pour the water into the roots, choosing the evening in mild weather for so doing, and the morning when the air is frosty.

Transplanting, &c.—Some gardeners advocate the transplanting of autumn seedlings as soon as they have made a few roots, into 60-sized pots, which are placed in an open airy frame, or other sheltered place having facilities for protecting them from frost. As they fill the smaller pots with their roots, they are transplanted into larger ones, taking care that the roots never get matted in their pots; and early in February the first crop is placed out on a south border, the holes prepared for them having received a barrowful of thoroughly rotten dung, over which the mould is replaced, forming a little hillock on which the cauliflowers are planted. They are covered with the hand-glass till thoroughly established. By pursuing this course all check on the vigorous growth of the plant is avoided, while the tendency to increased luxuriance, so necessary in plants whose leaves or flowers are eaten, is encouraged.

Watering.—After planting out, copious watering should be given in the mornings in dull, cloudy weather, or in the evenings after bright sunshine.

Treatment of, during Winter.—On the approach of winter, the plants in flower may be taken up with as much earth at their roots as possible, and planted, or rather laid in by the roots, on their sides, in a light sandy soil, in some warm, sheltered place, where the frost can be excluded. In such a shed or frame they may be kept fresh and in condition for many weeks. Another way of protecting and preserving them is to dig pits in the ground, and to plant the cauliflowers in them, covering them with frames of long wheat straw, tied together in small bundles, and giving them air in fine weather.

CELERIAC.

The plant known as celeriac or turnip-rooted celery is a biennial, and is distinguished from celery itself, whose flavour it possesses, by its thick, fleshy, turnip-like root. Its cultivation is simple and easy. The seed is first sown in the same way and at the same time as that of ordinary celery. The young plants should be set about 3 inches apart in boxes in a cool house, or in



CELERIAC.

beds of rich mould, and when large enough and sufficiently hardened off, the plants should be transferred to an open piece of ground and set about 12 or 15 inches apart. As the leaf-stalks are not blanched, the plant being grown for the root only, there is no occasion to plant it in trenches. The roots may be taken up and stored in an outhouse when ready for use, which will be about the end of October or beginning of November.

CELERY.

As this most valuable vegetable is usually put on table as an accompaniment to cheese in the winter months, during which it is in season, it has been included among those which are comprised in the "salad" section. It must be borne in mind, however, that it is equally good and useful when stewed and served in white sauce, and that few soups are perfect in which celery or celery seed has not been used as flavouring.

Propagation, &c.—Celery is propagated

by seed, which is best obtained from the seedshops. It may be sown in any month from Christmas to April. To get plants for the table in September, seeds should be sown in February in pans, which should be placed on a moderate hotbed. In about three weeks they will germinate, and, when about 2 inches high, the plants should be pricked out under glass, either in a frame or in-pots, in a compost of loam, and three-parts well-rotted dung. If in pots, shift them in April, and at the end of May plant them in shallow trenches in a warm part of the garden. If the trenches are dug out to the depth of 2 feet, 6 inches of hot dung

ing them out in fresh loam and decomposed leaf-mould when large enough to handle.

Planting out in Trenches.—The plants should be placed 8 inches apart in the trenches, and the trenches from 4 to 6 feet apart, according to the size of plants required. The trenches should be about 15 inches wide and the plants should be planted in a single row along the middle of each trench. When the plants are about 18 inches high, blanching commences by throwing the soil round the roots and ridging up, the intermediate ground being planted with coleworts, lettuce, and other light crops likely to be off before the celery requires earthing-up.

Watering and Shading.—Immediately after planting, a copious watering should be given. In its wild state, celery delights in situations where it can receive an unlimited supply of moisture; and nature is always an excellent guide where cultivation is concerned. Celery trenches should, then, throughout their growth receive abundant supplies of water. When planted, the bed or trench is usually a few inches below the neighbouring soil. The trenches should have some means of shading from the glare of the noonday sun; old lights, bushes of firs, or other dense objects, for a few hours every day, will suffice. Crops of peas are sometimes grown between the rows to afford the required shelter, and there can be no more economical mode of supplying it, provided the rows run from north to south, and are sufficiently apart to admit of it.

Subsequent Treatment.—The subsequent treatment of celery is very simple. Remove all side shoots and weeds, stir the earth frequently, and water whenever required, occasionally with weak manure water; sometimes adding a little quicklime to the water for the benefit of worms and slugs. If the celery fly appears, a little soot, applied dry or in water, and sprinkled



placed in the bottom to stimulate the plants, the soil replaced, and the plants put in and covered with hand-glasses, an early crop will be the result. A second sowing should be made in March, still on a hotbed or on pans, or protected by sashes and mats until the plants are up; when fit to handle, they should be pricked out on a slight hotbed, or on a warm border. After a few weeks they should be again transplanted into a similar bed, and placed 4 or 5 inches apart each way. In July the plants will be fit to plant out in trenches for autumn use. A third sowing in April, treated in a similar manner, will be ready for winter use, prick-

CHERVIL—CHILIS.

over the foliage, will be useful. After these waterings, a thin covering of dry soil thrown over the trench will check evaporation. As the time for banking up approaches, it is the practice in some places to tie the plants up with bast strings, partly to keep the outer leaves in proper order, but partly also to assist in the blanching process. When lightly tied up at the top, the centre is encouraged to rise and swell.

Lifting Celery. — In lifting celery, "always begin at one end of a row," says Mr. McIntosh, "taking the plants up by the roots, and carefully avoid bruising the stems or breaking the leaves." Cut the roots off, and bury them in the trench; but remove the plant to the vegetable house. Remove the outer leaves to be washed, and reserved for soups. The centre part carefully examine, and remove discoloured portions; and when washed clean, dip it in clear salt and water, to dislodge any small worms; this done, it passes out of the gardener's care. As frost sets in, a quantity of the crop for immediate use should be taken up; removing the roots and soil, and tying the leaves together, convey them to the root cellar, and lay them in sand, not too dry. Look to them from time to time, to see that they do not get too dry.

There are many kinds of celery in cultivation. Of late years various new sorts have been introduced, and it is better to refer the reader to the growers' price lists for these than to give a list here, which in a very brief time may require alteration.

CHERVIL.

For summer use this salad herb should be sown in March or April, on soil well dug over and manured, in drills about 9 inches apart. The sowing may be made on a warm sunny border; but for winter use a warm and dry situation should be selected, in which a sowing should be made in August. The winter crop will

need protection when the nights are frosty; this may be afforded by mats sustained on bent sticks.

CHICORY, SAVORY OR WILD ENDIVE.

The tender shoots of the chicory, whose root when baked and ground is used in the adulteration of coffee, form a useful ingredient for salads in the winter season. The plants from which the shoots are obtained are got from seed sown in the middle of spring, in drills about 9 inches apart, the plants being thinned out to the



CHICORY, OR WILD ENDIVE, KNOWN IN FRANCE AS "BARBE-DE-CAPUCIN."

same distance apart in the drills. In the winter the roots should be taken up, and put in boxes in light soil. The boxes should then be placed in any warm position in which the growth of the sprouts from the roots will be excited by the heat. The light must be carefully excluded from the growing shoots in order to blanch them and to keep them in a crisp and tender state.

CHILIS.

The fruit of the chili, like that of the capsicum, is extremely hot and pungent. That of the capsicum is useful for pickling and for eating, when fresh and cut up and infused in vinegar, with roast mutton. Chilis also are used for pickling, and for

infusion in vinegar. They are usually grown



CHILI PEPPER (PLANT).

flowers that are growing there. Their culture is simple and easy : the plants must be raised from seed sown in a hot-bed, or placed over gentle bottom heat, and as they increase in size they must be shifted singly into small pots at first, and thence into larger pots, as may be found necessary. Capsicums and chilis can be used in the green state as well as when ripe and red, and those who are content with the fruit in this condition may set the plants in the open border at the end of June. They will not ripen their fruit in this position.



CHILI PEPPERS.

CHIVES.

A hardy perennial propagated by division of the roots in spring or autumn, thriving in any ordinary garden soil. The plants should be set in the ground in small clumps or bunches about 9 inches apart each way. The onion-like leaves—like in shape and flavour—are useful in soups, salads, &c., and are preferable, for the former being less strong in flavour than the onion. They are useful also for cutting up and mixing with the food of turkeys newly hatched.

CLUBBING IN CABBAGES.

This disease, so destructive to a crop of broccoli, and to the cabbage tribe gener-

ally, especially on poor land and under indifferent culture, may be prevented, in some degree, by dipping the roots, before planting, in a thick mixture, composed of $\frac{1}{2}$ peck of soot and 1 lb. of saltpetre, with water added to make it the consistency of paste. A more certain remedy, however, is found in a proper system of cropping and manuring, by which this exhausting vegetable is made to follow, in rotation, crops which act as deepeners and restorers of the qualities withdrawn by previous crops of Brassicæ.

The effects of the club become apparent in hot sunny days : cabbages, &c., hang down and turn blue, and often become infested with aphid. This disease is, perhaps, the most vexatious with which the gardener has to deal. How far it may be prevented by the use of wood ashes, &c., is a matter of doubt. The most prominent causes of clubbing seem to be : firstly, an injudicious application of manure in small gardens that are already too manured—the most prevalent cause ; and, secondly, the exhausted state of the soil, arising from the too unvaried use to which it is put ; either of these circumstances tending to foster the insect to whose work the clubbing itself is certainly due. The plants that are subject to the disease are strong feeders, and exhaust the soil very much ; but it is reasonable to suppose they leave food suitable for other plants. Instances have been known of ground being left to weeds for several years, when, although cabbages clubbed badly before, they did not after the rest from cultivation that it had experienced ; the ground showing a fertility that would justify any one in believing that weeds have a wonderful faculty for restoring ground that had been exhausted by kitchen crops.

CORN SALAD.

This ingredient for salad, which is also known as "lamb's lettuce," may be had

CROPS IN COTTAGE GARDENS.

all the year round by sowing in February and March for use in summer, and in September for winter use and for early spring. Sow in drills, about 6 inches apart, in light, rich soil, in a warm situation. The leaves should be eaten when they are young and tender. If the plants show any tendency to run to seed, it is better to take them up and pick off such leaves as may still be eatable, unless it be desired to save seed.

COTTAGE GARDENS, ROTATION OF CROPS IN.

The market gardener, or gardener on an extensive scale, will hardly expect to find information on the succession, or sequence, and rotation of crops, in a handbook of this size, and perhaps would be averse to adopting it if given, but for the simple requirements of the cottage gardener and holder of allotment ground the following rotation of crops has been strongly recommended. It applies to a rood or quarter of an acre, and supposes the breadth of the land to be $27\frac{1}{2}$ yards, and the length 44 yards, which makes just one rood. Of this piece of land make three equal divisions, and crop as follows :—

FIRST DIVISION.

<i>Time of Planting.</i>	<i>Nature of Crops.</i>
First week in March	22 rows of potatoes, 2 feet between each row ; sets to be 1 foot apart in planting.
	<i>Sorts :</i> York Regents, Flukes, and Fortyfold, or a portion of each.
An alley of one foot between this and the next division.	

SECOND DIVISION.

Middle of March	2 rows of Windsor beans.
Early in March	4 rows of hollow-crowned parsnips.
End of February.....	4 rows of Altringham carrots.
	5 rows of onions, globe or French .
End of March.....	1 row of Windsor

Early in May	4 rows of turnips.
"	2 rows of beetroot.
First week in May.....	1 row of scarlet runners. With a foot alley between each sort.

THIRD DIVISION.

Last week in February...	2 rows of ash-leaved kidney potatoes.
"	3 rows of matchless cabbage, or York cabbage.
Early in March	1 row of marrowfat peas.
"	3 rows of ash-leaved kidneys (Cape broccoli after).
Last week in February...	6 rows of ash-leaved kidneys (celery after).
"	1 row of early long-pod beans.
"	1 row of early peas (celery after).
End of March	1 row of cauliflowers (stone turnips after).
Plant as early as possible	2 rows of lettuce (autumn cabbages after).

With a foot alley between each sort.

First Division.—Potatoes. Note that winter and spring broccoli, and winter cabbage and spinach take this division directly the potatoes are off.

Second Division.—Root crop. Note that this division is to be trenched for the main crop of potatoes for the next year directly the roots are off.

Third Division.—Mixed or early crop. Note that this division is to be occupied with flying crops, such as turnips and lettuces, &c., in the autumn, and to be sown with the usual root crops next spring.

There will be but little, if any, difficulty in following the rotation and sequence of crops as given above. It will be seen at once that the principle lies in dividing the ground into three crops, which arrangement provides that in each division two years must elapse before it is again cropped in the same manner. Reduced to a tabular form, the succession of crops stands as follows :—

FIRST YEAR.

First division	Potatoes, &c.
Second division	Root crop.
Third division	Mixed or early crop.

SECOND YEAR.

First division	Mixed or early crop.
Second division	Potatoes, &c.
Third division	Root crop.

THIRD YEAR.

First division	Root crop.
Second division	Mixed or early crop.
Third division	Potatoes, &c.

COTTAGE GARDENS, VEGETABLES
SUITABLE FOR.

It will be useful to append here a list, necessarily brief, of vegetables that are suited for the cottage garden. It might be easily extended, but the sorts named will be found sufficient for all practical purposes.

PEAS.

Early.

Carter's Lightning.

Carter's First Crop.

Laxton's Earliest of All.

Long-podded.

Tom Thumb.

McLean's Blue Peter.

American Wonder.

Dwarf.

Medium.

Auvergne.

Carter's Hundred-fold.

Laxton's Prolific.

McLean's Best of All.

Late.

Culverwell's Telegraph.

James's Prolific.

Laxton's Fillbasket.

BEANS.

Early Maragan.

Serville Giant Long-pod.

Carter's Improved Windsor.

Orange Jelly.

Purple Top Yellow Dutch.

ONION.

Brown Spanish.

Deptford.

James's Keeping.

LEeks.

Musselburgh.

London or Broad

Large Rouen.

SPINACH.

Round, for summer.
Prickly, for winter.
New Zealand.

FRENCH BEANS.

Canadian Wonder.
Newington Wonder.
Carter's Longsword.

RUNNER BEANS.

Carter's Champion.
Painted Lady.

CABBAGE.

Enfield Market, main crop.
Early York.
East Ham.
Rosette Colewort.

BRUSSELS SPROUTS.

BROCCOLI.

Early Cape.
Purple Sprouting.
Walcheren, or Cauliflower.

SAVOY.

Early Dwarf Ulm.
Little Pixie.

POTATOES.

Improved Ash-leaved Kidney.
York Regent.Beauty of Hebron.
Village Blacksmith.VEGETABLE MARROW.
Improved Custard.
Large Long White.
Large Cream.

CUCUMBER.

For outdoors.

Carter's Best of All.
Stockwood.

KALE.

Green Curled Scotch.
Welsh Kale.
Chou de Russie.

LETTUCE.

Hammersmith, for winter.

Black-seeded Brown Cos, all the year.
Tom Thumb Cabbage.

PARSNIPS.

Students.
Hollow-crowned.

CARROT.

Early Horn.
Intermediate.
James's Scarlet.
Long Red Surrey.
Scarlet Altringham.

TURNIP.

Early Dutch.
Hardy White Dutch.

RADISHES.

Scarlet Short-top.
Turnip, red and white.

CELERI.

Coles' Crystal Whits.
Coles' Defiance Red.

ENDIVE.

Green Curled, winter.
White Curled.

PARSLEY.

Double Curled.
Carter's New Perpetual.

CORN SALAD.

For winter use.

COTTAGE GARDENS, SEASONABLE CROPS
AND HERBS FOR.

Here may well be made a few brief remarks on the crops that are most useful in the cottage garden. A corner should be found in every garden for herbs, chives, an excellent substitute for onions in broth, salads, and savoury omelettes, parsley, thyme, sage, marjoram, knotted marjoram, lemon thyme, &c., whose use, unfortunately, is not so well known as it might be. Dill, fennel, horehound, and other herbs, may be sown in April or May. With reference to vegetables generally, the particulars relative to their culture are the same, whether applied to the large garden, the allotment, or the small plot of the cottager; but the cottager or allotment holder naturally desires to grow the most useful and profitable crops, and has neither time nor room for experimenting upon the various subjects placed before him; consequently he may save a great deal by becoming acquainted with what will best repay his time and labour. Perhaps the potato is more largely cultivated than any other crop among cottagers and allotment holders, because it is of more easy culture, and, where it does well, is

COUVE TRONCHUDA.

remunerative than others ; but the potato disease, for which no certain remedy is known, renders it a precarious crop. Parsnips are not likely to supersede it, because not so generally liked ; but those who are fond of this root will find it a profitable crop. Jerusalem artichokes yield abundantly, and will be found remunerative to those who like them. Cabbages are very profitable things to grow ; they head during the summer and autumn, and yield an abundance of sprouts during the winter, at which time they are excellent and nutritious food. Cottagers' kale is an excellent vegetable : after the head or top is cut for use, it yields an abundance of sweet and wholesome sprouts during the winter and spring months. Brussels sprouts may be grown for the same reasons. Broccoli, of such sorts as the Early Cape and Walcheren, which head the same year as sown, may be grown advantageously ; but late sorts, which occupy the ground nearly a twelvemonth before they are fit for use, are not so profitable. Scarlet-runner beans are always remunerative ; they yield, in abundance, a sweet and nutritious vegetable, and continue bearing a long time ; no cottage garden should be without them. French beans are also profitable for cottagers, and also broad beans for summer use. Where peas are grown, the dwarf and medium ought to be chosen, as the taller sorts require tall sticks, and are therefore more costly, and tend greatly to shade the ground on which they are grown.

Cultural Notes.—When early crops have been growing up to June, and are no longer serviceable, they should be removed without loss of time ; the ground dug or trenched, or forked over, preparatory to getting in crops for the winter and spring following. It will be useful here to point out such crops as would be most profitable in a small way. One of the cheapest means

of cropping at this time is to sow the ground with turnip seed : a quarter of a pound of seed (about 9d.) would sow half a dozen rods. If sown on newly dug ground, it would be up in three days, and would yield many dishes of a wholesome vegetable in winter ; leaving many plants to yield useful greens in March and April following. Other useful vegetables are borecole and Brussels sprouts : of the former the green-curved is much esteemed. There are others of equal merit ; all are very hardy and prolific, and furnish sprouts for the table from November to May. If they have not already been planted, it should be done as early as possible this month. Winter spinach is also useful, and, as the seed is cheap, it may be advantageously grown by the cottager. Coleworts, again, are very profitable ; they may be planted thickly, and give a good supply of greens for several months in succession. Where potatoes have been planted to any extent, such crops may be planted between the rows before the potatoes are lifted, so that no time is lost. If the plants are shaded until they are established, it will be no disadvantage ; they will be ready to start when the previous crops are removed : the ground can then be forked between. In November the gardener must be content to turn his attention mainly to the preparation of the soil for the ensuing year.

COUVE TRONCHUDA.

The culture and treatment of this variety of cabbage are the same as for the ordinary cabbage, the seed being sown in March or April, according to situation, and the young plants planted out in June and July. It is fit for use, like Savoys, after frosty weather sets in. From the similarity of the leaf stalks to seakale, for which it is a good substitute, it is sometimes called the Seakale Cabbage. The heart may be eaten as well as the leaf

stalks, being tender when dressed, and of delicious flavour.

CRESS, MUSTARD, &c.

These accompaniments to lettuce, &c., in forming a salad, or "saladings," as they



COUVE TRONCHUDA.

are sometimes called, may be obtained by sowing in the open ground in March and April on a sunny spot, and from April to October in a somewhat moist and sheltered situation. The seed should be sown thickly in shallow drills, and a sowing be made every fortnight for succession. The seed leaves only are eaten, because the leaves that show themselves next in order are rough and strong in flavour. For winter use, from October to March, seeds may be sown in boxes filled with light, rich mould, and placed in a greenhouse or window.

CUCUMBERS: THEIR CULTURE.

These can be grown under glass, or on a hotbed, at any season of the year, all that is necessary being to maintain the temperature of the house or frame, as the case may be, at a height ranging from 70° to 75°, but not falling below the former. It is unnecessary to describe the process of making a hotbed here, and for this the reader must be referred to the remarks on this subject on p. 241. The seed must be planted in good mould placed in pots, and these pots must be placed in the frame

when the rank steam and heat of the bed consequent on its first construction has passed off, and it is in a proper condition for their reception. The seeds may be placed in pots singly, or two or three in a 5-inch pot. Perhaps the former mode is preferable, as the roots are not disturbed when the plants are turned out of the pots to be placed in the soil that forms the surface of the bed. They grow very quickly, and will make their appearance above ground in two or three days.

Management of Plants in Frames, &c.

—When the plants have made two leaves, pinch out the point above the second; each plant will then send out two lateral shoots above the second leaf of each shoot; pick off the top. After that, stop them above every fruit, and, as the plants grow add fresh soil, till the whole bed is level,



CUCUMBER — ROLLISON'S IMPROVED TELEGRAPH.

taking care that the soil is of the same temperature as the bed before placing it in the frame, or the plants are likely to

receive a chill, which throws them back considerably.

Setting Fruit.—It will be necessary, between the months of October and April, to set each fruit as the flower opens. This is done by taking a male flower, and pulling off all but the centre—that is, the stamens supporting the anthers, which hold the farina or pollen—and applying this to the centre of the female flower, which may be distinguished by the rudiment of the fruit supporting it. This, in the warmer months, is the office of bees. Attracted to the flowers by the honey and pollen, they fertilise the female blossom in collecting it; but when there are no bees about, the cultivator must perform the task himself.

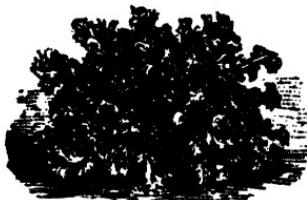
Cucumbers, Ridge, Gherkins, &c.—The instructions given above are, as it will be understood, wholly intended for the culture of cucumbers in frames. There are varieties, however, that can be grown in the open air, but the fruit is smaller, and far less wholesome, than that obtained from fruit under glass. The plants are raised from seed placed in pots at the end of March or the beginning of April. The pots are plunged in gentle heat on a hotbed, covered by a frame, and when the plants are up, as much air must be given to them as possible, and they must be stopped at least twice, in order to keep the growth within bounds as much as possible. About the middle of June, they may be transferred from the frame to the open ground on spots prepared for them by digging holes in the earth about 18 inches or 2 feet in diameter, and about 18 inches below the surface of the soil. The earth taken out should be disposed in a hillock over the manure, the top of the hillock being about 9 inches above the ground level, and therefore above the manure also. The ground should be prepared four or five days before the plants are put out.

ENDIVE.

This vegetable is grown chiefly for winter use and for salads in early spring.

Propagation of the Soil.—Trench the ground to a depth of two feet, mixing a very liberal dressing of rich and thoroughly decayed manure. For crops intended to stand the winter, a light, dry, and rather poor soil is best, and they should be planted in a sheltered situation.

Time and Manner of Sowing.—Make the first sowing about the middle of May on a bed of well-pulverised rich soil, scattering the seed thinly, and covering it lightly, or sow in drills, if it is not intended to transplant them. If sown in drills, let the rows be from 12 to 15 inches apart, and thin out



GREEN CURLLED ENDIVE.

the plants to the same distance apart in the beds. If sown broadcast, the plants must be thinned out to the distance of 4 or 5 inches apart, and when large enough transplanted into ground that has been richly manured. The plants should be about 3 inches high before they are transplanted. They should be set the same distance apart as prescribed for thinning out plants sown in drills. Plenty of water should be given when the weather is dry, and liquid manure occasionally. For the main crop sow in the middle of June, and again about the middle of July. Plants to stand the winter should be sown early in August.

Planting and After-management.—When the plants are about 4 inches high, transplant, lifting them carefully with as much soil as can be kept about their roots.

Place them in about 3 inches deep and 12 to 14 inches apart, and leave about the same distance between the plants. Give a liberal supply of water immediately after

at the bottom of a south wall, or in other sheltered situation. In many localities these plants require the protection of glass to winter them safely.

The best varieties are the Green Curled, Batavian Green, Batavian White, White curled, and New Moss curled.

FENNEL.

Fennel may be raised from seed in April or May. The seed should be covered lightly with fine mould, and, when the plants are strong enough, they may be set out in a bed about a foot apart. A good bed of fennel will last for years; but to insure fine leaves, the flower-stalks should always be cut off as soon as they appear, so as never to ripen seed.



planting, and as often as may be requisite to keep the soil moist. Beyond watering and keeping the surface of the soil open and free from weeds, the plants will require no further attention till they are nearly full-grown, when means should be used to blanch them. In the case of the earlier crops this may be done by tying them up when dry, after the same fashion as lettuce, and drawing the soil about them so as to fill the drills in which they are planted, then ridging up the soil two or three inches round each plant. But as late crops intended for winter use are liable to be injured by frost, these should be blanched by covering the plants with inverted pots. When severe weather is feared, a portion of the plants sown in July may be lifted with balls and planted closely together in pits or frames, where they can be protected from frost and wet, yet be fully exposed to the air when the weather permits. Tying and covering should be done at intervals, so as to have a continuous supply well blanched as they may be required for use. The August sowing should be planted out

FRENCH BEANS. *See Beans, Kidney.*

GARLIC.

This bulb, which, from the strength of its odour and pungency of its taste, requires to be used in small quantities, is propagated, planted, and managed in precisely the same manner as the shallot, *which see*. A number of bulblets, tech-



nically known as "cloves," are found grouped together in one whitish integument, or capsule, which holds them, as it were, within a sack. A clove inserted in

the knuckle of a shoulder or leg of mutton imparts a slight flavour to the whole joint, and a rump steak is much improved by being placed and eaten on a plate that has been rubbed over for the purpose with a clove of garlic cut in two. In planting, the cloves should be set separately.

GARNISHING, HERBS FOR.

These are handsome in growth, and useful for domestic purposes. Among them we may enumerate the ice-plant, the curled mallow, Melville's garnishing borage, triple curled cress and parsley. Of these the last-named herb will be found the most useful, and care should be taken to main-



GOULD—WHITE VEGETABLE MARROW.

tain a plentiful and constant supply by making a fresh sowing every year. Nothing, indeed, by reason of its small size and beautiful colour, is so appropriate as parsley as a garnish for cold meats of every kind. Borage is also a garnishing herb, but is used especially as a garnish for cool cups.

GOURDS.

All vegetables of this class, including pumpkins and vegetable marrows, which produce an immense amount of food, may be profitably and easily cultivated by attending to the following directions:—The seed should be sown in April or May, in pots or pans of rich light soil, and raised in a warm frame. As soon as possible, the

young plants should be potted off, and hardened in a cold frame for planting out in the open ground, preferably on manure heaps, or soil taken out of ponds, at the end of May or early in June. Marrows contain a rich sugary and farinaceous matter, and are a most excellent and nutritious article of diet when dressed in the following manner:—Cut the marrows into short pieces, take out all the pith and seeds, and boil them in plenty of water with a little salt. When well boiled, scrape out all the marrow, put it between two dishes, and squeeze out all the water; then mash it well, adding salt, pepper, and a little butter. It is then a dish fit for any table. The cultivation Mr. Cuthill recommends is to sow the seed about the first week in May in the open ground, in a warm corner, and when large enough, transplanted to moderately rich land. "I can grow," he adds, "twenty tons of the marrows to the acre easily; and when ripe, they can be stowed away anywhere, and will keep good for a very great length of time. In addition to their utility as a vegetable for the table, they form a most excellent and economical article when boiled for fattening pigs." For further information on this subject, see *Marrow* and *Pumpkin*.

HERB-GARDEN.

The *olitory*, or herb-garden, is a department of horticulture somewhat neglected, and yet the culture and curing of simples was formerly a part of a lady's education. All the sweet herbs are pretty, and a strip of ground half-way between the kitchen and the flower-garden would keep them more immediately under the eye of the mistress. This would probably recover, for our soups and salads, some of the neglected tarragons, French sorrel, purslain, chervil, dill, and clary, which are only found now in the pages of the old herbals. Laid out after a simple geometric design,

the herb-garden might be rather ornamental than otherwise. Most of the herbs are propagated by slips in the autumn. *Basil*, *burnet*, and other herbs, require to be sown early in spring, on slight hotbeds of about 2 feet in depth; but many cultivators leave them later, and sow in the open ground. *Thyme*, the *marjoram*, including *pot* and *sweet knotted marjoram*, *savory*, *hyssop*, *chervil*, and *coriander*, may be sown in dry mild weather, to be transplanted afterwards. Sow in shallow drills about half an inch deep and 8 or 9 inches apart, and cover in evenly with the soil. *Mint* may be propagated by separating the roots, and planting them in drills drawn with a hoe 6 inches asunder, covering them with an inch of earth, and raking smooth. They will quickly take root, and grow freely for use in the summer. This method may be applied to the several sorts of *spearmint*, *peppermint*, and *lamb mint*.

The whole family of *borage*, *burnet*, *clary*, *marigolds*, *cardus*, *dill*, *fennel*, *buglos*, *sorrel*, and *angelica*, may be sown about the middle of March, when the weather is open. Sow moderately thin in drills or beds (each sort separate), in good light soil; if in drills 6 inches apart; some of the plants may remain where planted, after a thinning for early use; others may be planted out in the summer. Cultural directions respecting herbs are given in the calendar for each month.

HORSERADISH.

This much-relished accompaniment to roast beef, should be grown on an open spot. It is a mistake to suppose this crop can be stowed away in any corner or out-of-the-way place; it requires high culture to produce it good, and it repays good treatment as well as any crop. The best mode of culture is to trench the ground to the depth of 3 feet, but to be rather sparing of manure,

produces a tendency to fork; the ground should be well broken any time during the winter. Then take up some old roots and trim them for the kitchen, cutting off the crowns about an inch and a half long—these latter are for planting. Next, with a dibble, which is marked 2 feet from the lower end—that being the depth the crowns are to be planted—make holes 2 feet apart in rows 3 feet apart. This done, take a lath-stick split at one end, insert the crown in the slit, thrust it down to the bottom of



HORSERADISH.

the hole, and push it out by another stick which is thrust down for the purpose. It is unnecessary to fill up the holes, as they gradually fill as the horseradish nears the surface. If a fresh row is planted every year, and another taken up, the crop will be kept in good condition, and a fresh piece of improved ground offered every year for other crops.

JERUSALEM ARTICHOKE. See Artichoke, Jerusalem.

KALE. See Borecole and Cottager's Kale.

KITCHEN GARDEN SEEDS.

KIDNEY BEAN. See Bean, French, or Kidney.

KITCHEN-GARDEN SEEDS.

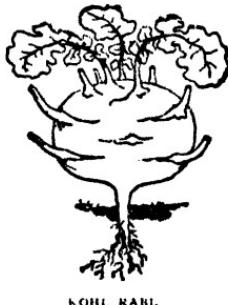
To save seeds is a work of some trouble. It causes a great waste of ground, exhaustion of soil, and also involves much labour. Good seeds can now be purchased at a very reasonable rate, and novelties in every kind of vegetable are continually being introduced. Most seedsmen publish lists of seeds with prices, suitable in quantity to gardens of all

sizes, and as the demand for seeds is an annual one, no man of character will venture to hazard his reputation and his interest by sending out bad seed. It is very easy to test the growing qualities of seeds, and this is always done by our leading seedsmen before they are packed up and offered for sale. The collections of kitchen-garden seeds offered and supplied are so varied in sorts, and so moderate in price, that the generality of gardeners may well be spared the trouble of saving seeds, and use their land for crops that will prove more useful to the grower.

NAME.	£3 3 0 Collection.	£2 2 0 Collection.	£1 11 6 Collection.	£1 1 0 Collection.	£0 10 6 Collection.
Peas, best varieties for succession...	18 quarts	11 quarts	8 quarts	6 quarts	4 pints
Beans, broad, the best sorts	6 quarts	4 quarts	3 quarts	2 quarts	2 pints
— French, dwarf varieties	2 pints	16 pints	1 pint	1 pint	16 pints
— Runners	2 pints	1 quart	14 pints	1 pint	1 pint
Beet, Dell's and other sorts	2 packets	2 packets	1 packet	1 packet	1 packet
Borecole or Kale, best sorts	4 packets	3 packets	3 packets	2 packets	1 packet
Broccoli, best early and late sorts	8 packets	6 packets	5 packets	4 packets	2 packets
Brussels Sprouts, finest	1 packet	1 packet	1 packet	1 packet	1 packet
Cabbage, best sorts for succession	7 packets	6 packets	5 packets	4 packets	2 packets
— Savoy, best sorts	3 packets	2 packets	2 packets	1 packet	1 packet
Capsicum	1 packet	1 packet	1 packet	1 packet	1 packet
Carrot, for forcing and general crop	14 ounces	8 ounces	4 ounces	3 ounces	1½ ounces
Cauliflower, best for succession...	2 packets	2 packets	1 packet	1 packet	1 packet
Celery, of sorts	2 packets	2 packets	2 packets	2 packets	1 packet
Couve Tronchuda	1 packet	1 packet	1 packet	1 packet	1 packet
Corn Salad	1 packet	1 packet	1 packet	1 packet	1 packet
Cress, plain, curled, &c.	½ pint and 6 ounces	8 ounces	6 ounces	4 ounces	2 ounces
Cucumbers, of sorts	4 packets	3 packets	2 packets	1 packet	1 packet
Endive, best sorts	3 packets	2 packets	1 packet	1 packet	1 packet
Herbs, of sorts	6 packets	4 packets	3 packets	2 packets	2 packets
Leek, best sorts	1 ounce	1 packet	1 packet	1 packet	1 packet
Lettuce, best Cos and Cabbage...	6 packets	4 packets	3 packets	3 packets	2 packets
Melon, finest sorts	3 packets	2 packets	1 packet	1 packet	1 packet
Mustard, white	1 quart	1 pint	½ pint	4 ounces	2 ounces
Onion, White Spanish and others..	12 ounces	8 ounces	6 ounces	3 ounces	1½ ounces
Orach	1 packet	1 packet	1 packet	1 packet	1 packet
Parsley, garnishing, &c.	2 ounces	1 ounce	1 packet	1 ounce	1 packet
Parsnip, Hollow Crowned	4 ounces	3 ounces	2 ounces	1 ounce	1 packet
Radish, best sorts for succession	1 pint and 12 ounces	9 ounces	6 ounces	4 ounces	2 ounces
Rampion	1 packet	1 packet	1 packet	1 packet	1 packet
Salsify	1 packet	1 packet	1 packet	1 packet	1 packet
Scorzonera	1 packet	1 packet	1 packet	1 packet	1 packet
Spinach, summer and winter sorts	2 pints	16 pints	1 pint	4 ounces	2 ounces
Tomato	1 packet	1 packet	1 packet	1 packet	1 packet
Turnip, Snowball and others	12 ounces	5 ounces	8 ounces	3 ounces	2 packets
Vegetable Marrow	2 packets	1 packet	1 packet	1 packet	1 packet

By some seedmen these seeds are classified in six sections, as follows:—1. Leguminous Section; 2. Edible Leaved and Edible flowered Section; 3. Edible Rooted Section; 4. Edible Fruited Section; 5. Salad Section; and 6. Pot, Sweet and Garnishing Herb Section. The number prefixed to each kind of seed in the first column indicates the section to which it belongs. It may be added that all the leading seedsmen supply larger collections than those indicated above, at prices ranging from four guineas upwards, according to quantity.

The preceding is an enumeration of the seeds necessary for a year's supply, with quantities and prices to suit gardens of five different sizes, but with reference to them



KOHL RABI.

it may be said that it is not in strict accordance with economy in gardening to adopt any one or the other of them implicitly, and the buyer will too often find among them many packets that the small grower does not absolutely require, and which in all probability he would not use. It is best to make one's own selection from the price lists, altogether omitting the *Brassiae*, plants of which can always be bought for 6d. per 100.

KOHL RABI.

A hardy vegetable partaking of the nature of the cabbage and turnip, having a bulbous-shaped stem like the latter, with broad leaves growing here and there from the top of the stem. It does not suffer from drought or frost, and when the stem is eaten young it is tender and palatable. The sorts best suited for garden use are the Early White Vienna and Early Purple Vienna, so named from the colour of the skin of the stem. Sow seed at any time from April to June. If in permanent quarters sow in drills 15 inches apart, and thin out to 12 inches between the plants. If sown in seed-bed, transplant when young to the distances

already named, and water occasionally until the plants show signs of growth.

LEEEKS.

Leeks, for the main crop, are usually sown in April, about the same time as onions. Some gardeners sow them with a small sowing of onions, the latter being drawn young for salading, and the leeks being left on the bed, or planted out. Some sow them in drills 18 inches or even 2 feet apart, and thin them to a foot or so apart in the row, planting the thinnings at the same distance. This gives room to draw earth up to them for the purpose of blanching the root and stem. Sow very shallow, tread, and rake, provided the ground admits of it: thin before the plants interfere with each other, and water in dry weather. This crop delights in a light rich soil, and in moist seasons grows very large. The London Flag is the sort most usually grown; but the Scotch or Musselburgh is esteemed by many as growing larger. The above method of growing leeks is a good one, but the better way to obtain



LEEK.—LONDON FLAG.

leeks of considerable size and well blanched is to grow them in trenches, in the same manner as celery; but the trenches need not be more than 8 or 9 inches deep. The trenches should be well manured,

But if no manure is added to the soil a substitute must be found for it in the shape of liquid manure. As the plants grow, the earth in the sides of the trench should be raked in so as to fill it and cover the



COS LETTUCE.

plants as high as possible, thus blanching them.

LETTUCE.

Lettuces are a surface crop, and light feeders; consequently, by giving plenty of manure, we not only insure good lettuces, but prepare the ground for a grosser-feeding crop, sowing the seed broadcast, and treading it in if on light soil. On wet ground, if apt to bind or clod, this is not to be recommended; but mark the ground into one or more beds, 4 feet wide, with alleys 15 inches in width between. Standing in the alleys, sow the seed, and press it in with the rake, or cover with some light soil.

Sowing for succession.—Where a succession of lettuces is required throughout the year, it will be necessary to sow once a month till March; after that once a fortnight, or every three weeks; for although a crop may last a month in moist weather, they are soon over in the hot summer months, and it is as well to be provided with plenty of young plants for succession. After August, once a month will be often enough. Sow the seed thinly over a piece of ground sufficient to grow a fortnight's

supply; when large enough to transplant, thin them out to a foot apart, and plant the thinnings a foot apart on a piece the same size; those left in the bed come in first, and the others are ready to succeed them. In summer, sow on a larger space, and let them grow where sown.

Blanching.—Cos lettuces require tying up to blanch and crisp them. To do this expeditiously, provide a bundle of bast matting, cut to the required length, sling it round the waist, and gathering each plant up, pass the hand rapidly round it. In this way a score or two may be tied in a few minutes.

of the most hardy sorts, and best for sowing at any time, is the Black-seeded Bath Cos; it is very crisp, and of good flavour. Another good sort is the Moor Park Cos, and also the Paris White Cos. Of the cabbage lettuces, one of the best, especially for winter use, is the Hardy Green Hammersmith; but it is apt to run in summer and autumn. The Brown Dutch, Tennis-Ball, and Tom Thumb Cabbage lettuces are good varieties, and very hardy, the last named being excellent for spring sowing. The Malta, or Drum-Head Cabbage, is a fine large lettuce, and good for summer use, as it is not apt to run if allowed plenty of



CABBAGE LETTUCE.

room. The Neapolitan Cabbage is also noteworthy for its great size and crispness. The advantage of cabbage lettuces is, that they require no tying up, which prevents cos lettuces being serviceable in winter, as

they so soon rot off when tied ; but such sorts as the London Cos, which turn in without tying, may be grown advantageously in winter. Many other sorts



MUSHROOMS.

will be found named in the price lists of the principal seedsmen.

MINT.

This herb grows from pieces of the roots, which spread with rapidity ; for every piece that shows a joint will grow. It requires a moist soil, and the bed in which it is placed should be enclosed with a string, brick, or tile edging, as it is frequently very troublesome in running about. Division of the roots should be made in February or March. When the plants are about to bloom, the stalks should be cut and dried for winter use. Towards the close of autumn all the stalks that remain should be cut down to the ground, and the bed covered with fresh soil to the depth of 1 inch. The varieties of mint grown in gardens are spearmint, peppermint, and pennyroyal, the last-named being used chiefly for medicinal purposes.

MUSHROOMS.

Mushrooms may easily be had at any season of the year by adopting an artificial process, and spawning, with artificial spawn, which may be obtained in cakes from any

nurseryman, a bed made after the following manner :—The best situation for the artificial growth of mushrooms is a cellar or underground tool-house, or any other place where the atmosphere is of that damp, foggy character which is always so peculiarly favourable to the growth of fungi. The antechamber or passage to an ice-house is an excellent place for a mushroom bed, and is frequently made use of for this purpose : any shed, however, whether underground or not, may be made available ; and, indeed, with a little more care, mushrooms may be grown in the open air, without any roof to cover them at all ; but a cellar or underground hole has a decided preference. The foundation of the bed must be well-rotted manure from the horse-yard, which has been sweetened by being turned over two or three times : it may have a little good loam mixed with it, in the proportion of about two to four barrows of loam to twelve of manure. The bed, which should never be carried above 2 feet in height, is best made on a gentle slope, and the manure should be well and firmly beaten down with a spade.



MUSHROOMS ON SHELVES IN SHED OR CELLAR.

When the heat has fallen to about 75°, the spawn may be put in. This artificial spawn, which is usually made up in cakes, must be broken up into pieces about 2 inches square, and placed all over the bed, upon

the surface of the manure, about 10 or 12 inches apart. A covering of 1 inch, or $1\frac{1}{2}$ inches, of good garden loam is then to be placed all over the bed, and the surface again beaten firm with a spade. The whole must then be covered well over with straw or other material, to exclude all light. The growth of the mushrooms will, of course, depend somewhat on the state of the atmosphere; but in a temperature of 45° to 55° they will usually begin to appear in about six weeks. Little or no water should be given to the bed until the mushrooms begin to come up, as its own moisture and heat ought to be sufficient to start the spawn; but as soon as mushrooms appear, a plentiful supply of water may be given, and it will be found that a little common salt, or, better still, saltpetre, will have a great effect upon the crop. It is essential that the surface of the bed be kept quite dark. If the bed be made in the open air, it may be necessary, after a time, to give to the spawn a fresh start, by placing a lining of hot manure around it; but on all occasions great care must be taken that the heat of the bed is not so excessive as to burn up the spawn. This, however, can never happen at a temperature of 75° ; and when a bed is above this, no spawn should ever be inserted.

Much has been said about letting the bed all but cool before spawning: it is better, perhaps, to choose a high rather than low temperature, because the spawn sets to work more freely and rapidly, and the mushrooms come up more uniformly over the bed. The process of spawning has been already described. It is not advisable to case the bed (that is, putting a case of good fresh loamy soil of about 2 or 3 inches in thickness all over it) immediately after spawning; but cover thinly with straw for a day or two, or till the spawn just begins to take hold of the dung; then case it, beating the soil firmly, and, lastly, put on

straw enough to exclude the light; and as the weather and the bed cool, increase the covering and add garden mats. In making mushroom beds, much depends on the quality of the spawn. Good spawn, which ought to be procured at all nurseries, &c., is full of fine downy-looking threads, and smells exactly like mushrooms; it is sometimes found in plenty in heaps of old manure that have been several years without being disturbed. Never use old spawn; if you do, you will, in all probability be disappointed in the crop. Fresh spawn from a large grower is always the best and most reliable.

MUSTARD.

If a supply is required in winter, or when the weather is too cold for the seed to vegetate out of doors, sow in shallow boxes or pans, placing these in a warm house or pit. During the heat of summer a shady border will be the most suitable situation. Make the surface of the soil fine, level, and smooth, then water it and sow the seed very thickly. Press it gently into the soil, but avoid covering it with soil, else the earth and sand will adhere to the leaves and be with difficulty removed by washing. Exclude the sun's rays, and keep the seeds moist by coverings; but these must be removed as soon as the seeds have fairly germinated. To furnish a regular supply, sow at intervals of a few days, and never allow the plants to get too old before being cut for use.

ONIONS.

Preparation of the Soil.—A rather strong, deep, and rich loamy soil is most suitable for this crop: where very large bulbs are desired, soil of this character is indispensable. Onions grown in a strong soil are much less liable to be attacked by the fly or maggot than in light, dry, sandy soils. The ground should be heavily dressed with

rich well-rotted manure, trenched deeply, and ridged up early in autumn. If the soil is light and sandy, cow manure will be most suitable.

Time and Mode of Sowing.—The main crop should be sown as early as the ground may be in working condition, and whether this occurs in February or early in March, a favourable opportunity for putting in the seed should not be suffered to pass. After levelling down the ridges, if the soil is light, tread the ground regularly and closely over, then rake and well pulverise the surface, making it as fine as possible. Set out the ground in 4 feet beds, with alleys 1 foot wide between; draw drills $\frac{1}{2}$ inch to 1 inch deep, 6 inches from each alley, and 9 inches apart. Sow the seeds thinly and regularly, and cover with the soil displaced in making the drills, where this is too lumpy, with other fine soil. A sowing should also be made about

the middle of August, to furnish a supply of young onions during winter, and bulbs for use in summer before the main crop is ready. Where small bulbs, such as are used for pickling, are required, sow the Silver-skinned thickly early in May, upon the poorest soil, and in the driest situation at command, and thin out very sparingly.

After-management.—The ground must be kept clear of weeds by frequent hoeings, and the plants thinned early, to from 6 to 9 inches apart. In dry, warm situations, strong manure water may be given freely during the summer; but where there is any danger of the crop running to "thick necks," or not forming bulbs, watering should not be practised, except when the

weather is very warm and dry, and then not after July. Towards the end of September the bulbs should be well formed, and the tops show indications



WHITE GLOBE ONION.

of ripening; go over the crops, bending or them down with the back of rake, and repeat this as often as may necessary to check the growth of the tops effectually. As soon as the bulbs seem to be properly matured, which will be known by the decay of the leaves, &c., take up, spread them in an airy situation in the open air, until thoroughly dried, and then store in a dry, cool place till wanted for use. The Lancashire method of wintering onions is, perhaps, — There they tie up



TRIPOLI LARGE GLOBE ONION.

what are called ropes, and hang them on an outside wall, not facing the sun, and protect them from wet by placing a board against the wall overhead. They keep

sound longer by this than by any other method.

There are many varieties of the onion, whose special names may be ascertained on reference to the seedmen's price lists and catalogues. The following, however, are useful sorts and may be recommended :—

White Spanish,—the mildest in flavour, and most useful for main crop.
Deptford, or **Strasburgh**,—similar to the above, but brown ; a useful and good-keeping variety.
Brown Globe,—a hardy useful kind.
New White Globe,—a mild-flavoured, good-keeping variety.
Giant Madeira,—grows to a great size, and particularly mild-flavoured.
Blood-Red,—a very useful hardy kind.
James's Keeping,—keeps longer than any other variety.
Silver-skinned,—the best for pickling.
Tripoli Italian Red,—the best variety for autumn sowing.
Tripoli Large Globe,—very fine for autumn sowing.
White Lisbon,—the variety sown in autumn by market gardeners for spring onions.

ONION, POTATO.

This onion, which, from its growth and manner of increase, is sometimes called the "underground" onion, is a valuable vegetable, because it furnishes sound, tender, and full-sized bulbs at midsummer, three months before the ordinary onion crop is harvested. It requires a well-worked, moderately rich soil. The bulbs may be planted in warm, sheltered situations, such as the south of Devon, in midwinter ; but in colder parts the planting must be deferred until late winter or early spring ; yet the earlier it can be effected the better. The bulbs should be set in rows from 12 to 15 inches apart, and from 12 to 15 inches apart also in the rows. Each bulb will throw out a number of offsets all round it, which grow and develop into full-sized bulbs, which are taken up and dried when ready for pulling, and then stored for use and for future propagation.

ONIONS, USEFUL DRESSING FOR.

If some common washing soda be

crushed and sprinkled over an onion bed just before rain, and the bed be watered after the soda has been scattered on it, the effect on the leaves will be perceptible very shortly after in increase of size, and the production of a beautiful bloom on them

PARSLEY.

Full crops of parsley should be sown in the spring along the edges of one of the borders. In order to grow this useful herb in perfection, it is necessary that the roots and stem should be kept in a perfectly dry state : this is indispensable to the health and freshness of the plant. In preparing the beds, therefore, remove the soil to the depth of 6 or 8 inches, and fill in the



FERN-LEAVED PARSLEY.

bottom with the same depth of stones, brick rubbish, and similar loose material. Over this prepare the bed of light rich soil, which will thus be raised considerably above the level of the ground, the bed being raked smooth and level. Towards the end of May, sow some seed of the most curly variety, either in shallow drills, slightly covered with fine soil, or thin broadcast raked in. If the weather continue dry, water frequently ; in five or six weeks the plants will have appeared ; when large enough, thin them out, so that they may be 4 or 5 inches apart. By the end of autumn they will be large and vigorous plants. At this time, drive a row of stakes or hoops into the ground, on each side of

the bed, so as to form arches strong enough to support a covering of mats, which should be laid over them as soon as frosty or wet weather threatens to set in. During intense frosts increase the protection, removing it on fine days, and removing it entirely in mild weather. The soil should be kept dry, and all decayed leaves carefully removed : in this manner this useful vegetable may be available all the winter.

Parsley is a biennial, and as it runs to seed in the second year, even when sown as late as possible in the previous year, it is necessary to make a sowing every year. To keep parsley available for culinary purposes as long as possible, remove the flower-stalks as soon as they appear. Green Curled Parsley is a useful variety for ordinary use, and Carter's "Perpetual" Parsley, which, it is said, stands for many years without ceasing to seed.

PARSNIPS.

Preparation of the Soil.—Parsnips succeed best in a deep, free, rich soil, and as the application of fresh manure tends to the production of forked and

formed roots, ground in high condition (having been heavily manured for the previous crop) should be selected. If manure is used, let it be well rotted, short farmyard manure, or use guano. The ground should be trenched 2 feet 6 inches, and ridged up as long as possible before sowing.

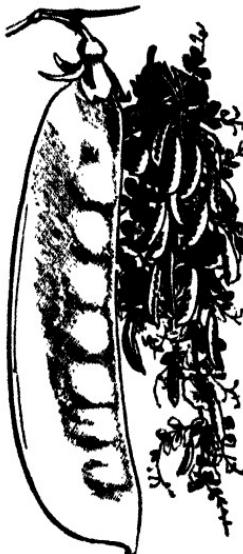
Time and Method of Sowing.—Sow in lines 15

to 18 inches apart, as early in spring as the ground can be found in fair working condition, scattering the seeds thinly, and covering them $\frac{1}{2}$ inch to 1 inch with the finest of the soil.



PARSNIP.

After-management.—When the plants are about 2 or 3 inches high, thin them out, leaving 6 or 8 inches between them. Keep the ground free from weeds, and the



TYPE OF GARDEN OR EDIBLE PEA.

surface open by frequent deep stirrings with the hoe. Towards the end of November take up the roots, and, after cutting off the tops, &c., either store them in damp sand, in a cellar, or pit, as is done with potatoes. The roots being hardy would be quite safe in the ground.

Among the varieties of the parsnip now sold by seedsmen Sutton's "Student" is an important acquisition ; of very superior flavour, with clean and handsome roots. Large Guernsey, and the Hollow Crowned, most useful for main crop, may be specially recommended.

PEAS.

Soil and Situation.—For heavy crops of this prime esculent a deep loamy soil

should be secured, but ordinary garden soil, if properly prepared and well manured, will yield abundantly. For an early crop, plant in the warmest and most sheltered situation; but for the main crops choose an open, airy situation; and instead of devoting a portion of the garden to peas alone, as is usually done, plant them in single lines amongst other crops: the plants will thus get more sun and air, and bear much longer and more abundantly.

Preparation of the Ground.—Trench to the depth of 2 feet, and ridge up roughly, exposing as large a surface as possible to the action of the weather; and this should be done as long before sowing as convenient. The summer and autumn crops will require abundance of well-rooted manure; but the early crop will come sooner into bearing if planted in poorer soil, which should be deep and well pulverised.

Time of Sowing.—Sow the first crop about the middle of November, the second early in January, putting in a small breadth of a second early variety at the same time; and to secure a constant succession, sow once a fortnight from this time till the end of June, or yet later. After the beginning of March sow the best kinds of Wrinkled Marrows; but for the last two sowings use a free-cropping early, or second early variety, and when the ground is sufficiently dry to work kindly.

Manner of Sowing.—Sow in drills two inches deep and four inches wide, covering the seed with friable soil. In sowing peas, they should be scattered evenly, at regular distances apart, so that there may be no crowding. If sown in successive rows, let the intervening space exceed the reputed height to which the variety grows by six or twelve inches. As the seed for the earlier crops will be some time in the ground exposed to the depredations of mice, &c., it should be sown thickly. The strong-growing branching kinds,

which are used for the main crops, succeed better if sown thinly, but it is prudent to guard against loss from various causes by sowing all rather thickly. If the plants are found to be too close when fairly started, they can easily be thinned out. French gardeners sometimes sow peas in clusters, making holes 8 or 10 inches apart in the rows, and planting in each five or six peas.

After-management.—Peas should be earthed up when about 3 inches high, and the sticks put to them before they begin to be taller on one side than the other, but not till they really require it, as sticks are likely to draw them up weak, especially if they are sown too thickly. Spruce fir or other evergreen branches will afford a useful shelter to early crops. Keep the ground between the rows well stirred and free from weeds. After sticking, they should be mulched, spreading the dung over a clear space of 18 inches on each side of the row, to the depth of 3 inches. In sticking peas, plenty of small brush should be placed near the ground, in order to conduct the peas upwards: it is useless to give them support above, and leave them without the means of getting to it. It is very necessary to mulch early crops of peas, especially where the soil is light: it protects the young roots from frost, and saves watering and manuring the ground for the next crop, and tends to produce a better and much earlier supply. Where ground is valuable, and the rows run from north to south, the space between the rows of peas may be filled with cabbages, onions, French beans, and other surface crops; but to do this with good effect there should be plenty of room between the rows.

Sorts.—For sorts now in the market, see the price lists of the principal nurserymen and seedsmen. They are very numerous and new varieties are constantly being introduced.

POTATOES, EARLY, IN OPEN GROUND.

For early crops, plant as early in January as the ground can be found in fair working condition. A small breadth of the ash-leaved kidney should be planted on a south border, or in the warmest and most sheltered situation at command, to furnish an early supply. In planting, let the ground be neatly levelled, then, beginning at one side, dig it over about 6 inches deep, and put in the sets in the openings at proper distances, which must be regulated by the growth of the variety. The lines for the early kinds, as ash-leaved, &c., which form but small tops, may be about 20 inches apart, leaving about 9 inches between the sets. The sets should be covered about 6 inches, leaving the soil over them as open and loose as possible. On strong, heavy land the ash-leaved and other weakly growers should not be covered more than 4 inches. Planting in autumn has been strongly recommended, and on light, well-drained land, it may safely be practised—the crop will probably be both earlier and more abundant than from late winter or spring planting. All things considered, planting early in spring is to be preferred.

POTATOES, MAIN CROP.

Soil.—A deep, thoroughly drained, light sandy loam, or peaty soil, is most suitable for the potato, although there are many sorts specially suitable for cold and heavy soils. The ground selected should be in fair condition, from having been moderately manured for some exhausting green crop in the previous season. But if the only land to be had is so poor as to render it necessary to apply manure in order to insure a fair crop, then use charred vegetable refuse, or a very light dressing of well-decayed farm or stable-yard manure. The ground should be trenched two spades deep, and ridged up early in autumn; if manure is

applied, this should be well mixed with the soil. Charred vegetable refuse, however, may be applied about the sets when they are planted. A slight sprinkling scattered along the trench before planting, and then used in covering the sets, is said to have proved a partial preventive of disease.

When to Plant.—The main crop should be got in late in March, or early in April. As the ground is more likely to be dry at this time, they may be dibbled in whole, thus yielding food for the young shoot till it can find its own—a most reasonable assumption, and worthy of adoption. When potatoes are cut, it is best to expose them for a day or two, to render the surface of the cut callous. In planting them, let it be in rows 2 feet apart; or, if space is not limited, allow 3 feet, which admits of planting later crops between, before they are taken up. Although little is gained by allowing too much room, much is lost by allowing too little; for root crops are apt to run all to haulm or top if too crowded. Two feet from row to row, and 15 inches from plant to plant, is a good average.

After-management.—When potatoes have grown 8 or 10 inches high, a little earth should be drawn up to them, just sufficient to cover any tubers that may grow near the surface; but too much earthing up produces luxuriance of growth in the haulm, and is contrary to nature. The ground should be thoroughly drained. It is generally admitted that the disease is most prevalent in wet soils or wet seasons. Some recommend cutting off the haulm as soon as the blight appears; this may save them in a great measure from the rot, but stops the growth of the tubers, and whether any real advantage is derived from it is still undecided. It is advisable to pick off all the flowers, unless seed is wanted, as

doing so will throw the strength of the plant into the process of forming tubers. In the case of the early varieties, which may be in danger of suffering from the frost, the soil should be kept ridged up round the shoots as soon as they appear above the ground, keeping them covered until they are 4 to 6 inches high, and all danger of frost is past. Before earthing up, fork the ground lightly between the lines, so as to pulverise the soil, then draw it to the plants with a hoe or spade. Keep the ground clear of weeds.

POTATOES, SUITABLE SORTS OF.

Appended, for the guidance of potato growers who may be desirous of trying new varieties, the following lots of potatoes recently introduced have been extracted from the catalogues (1892) of Messrs. James Carter and Co., High Holborn, London, W.C.; Messrs. Daniels Bros., Norwich; and Messrs. Sutton and Sons, Reading.

In two out of the three lists given below numbers will be found following the name of each variety. No. 1 indicates potatoes belonging to the First Early Section; No. 2, the Second Early Section; No. 3, the Mid-season Section; and No. 4, Main Crop and Late Varieties. When ordering seed potatoes for trial, the purchaser is advised to mention the kind of soil in which the tubers are to be planted when writing to the grower, and to leave it to him to select the sorts best suited to the character of the ground.

1. From Messrs. James Carter and Co.'s Seed Catalogue.

Ashtop Flake,—a white kidney; the handsomest potato in commerce.

Cosmopolitan,—handsome potato, of splendid quality, and excellent for field crops.

First Crop,—earliest, most prolific, and best kidney in cultivation.

Holborn Abundance,—disease-resisting. As productive as *Magnum Bonum*, with the better qualities of its parents—*White Elephant* and *Snowflake*.

Holborn Perfection,—in shape a flat oval; flesh yellowish white, of fine flavour.

Holborn Prolific,—valuable as an exhibition potato, or for table and market purposes.

Holborn Reliance,—produces prolific crops of large, even-sized potatoes of best quality.

Imperator,—a main crop white oval, of handsome appearance, and disease proof.

King of the Russets,—absolutely free from disease; yields 8 tons per acre.

Magnum Bonum (reselected),—said to be the heaviest cropping potato ever known.

Sukrata,—a roundish potato, of handsome form and excellent quality.

Surprise,—a splendid keeper, an enormous cropper, flesh white and floury.

The Cannon,—a heavy cropper; one of the best main crop kidney potatoes ever raised.

2. From Messrs. Daniels Bros.' List.

Colonel Long,—Tubers large, smooth, long, and handsome; very good croppers, floury, and of good flavour when cooked. New seedling.

Dreadnought (4),—new disease-resistant main crop variety, resembling but excelling “*Magnum Bonum*.”

Early Crimson Flourball (1),—A handsome round red potato, of excellent quality.

Early Puritan (1),—an early variety of great excellence, vigorous constitution, and very productive.

Early White Hebron (1),—the finest first early white-skinned potato in the world.

Emperor Frederick,—Fine exhibition potato; tubers large, and of kidney shade, of rich purple colour mottled with crimson; flesh white, dry, mealy, and of good flavour when cooked.

Future Fame (4),—“*Magnum Bonum*” type, but earlier; great disease-resister, heavy cropper.

Golden Flourball (4),—a fine, late, yellow-fleshed potato; a good keeper.

Harbinger (1),—a first early round variety of great excellence; haulm short.

Indian Prince,—very handsome black kidney, flesh white and floury when cooked; excellent cropper; looks well when exhibited. New seedling.

King Kidney (4),—robust grower and disease-resister, producing heavy crops.

Long Keeper (4),—fine red round variety of Red Skin Flourball type; good cropper; late keeper; tubers when cooked are white, firm, and dry, but not mealy.

Lys's Seedling,—handsome tubers of long white kidney shape; excellent croppers, good cooker; fine for exhibition.

Norfolk Blackbird (4),—a black potato, the colour of the skin penetrating deeply into the flesh, and sometimes producing a marbled appearance when cut.

Princess May,—very handsome red kidney, flat in shape; flesh of excellent quality when cooked; good cropper, and useful for exhibition. New seedling.

Purple Prince (4),—tubers round, and bright purple in colour shaded with crimson; heavy cropper; cooks well; and most desirable for exhibition.

Red Robin (4),—a late variety of kidney potato; a good cropper, and delicious in flavour.

Reliable (2)—handsome white kidney, of excellent cooking qualities; excellent cropper; useful for exhibition. New seedling.

Remarkable,—a first-class cropping variety; a good keeper, of splendid table qualities.

Royal Norfolk Russet (4),—one of the most remarkable potatoes ever raised; tubers rough, flesh white, floury when boiled. Synonymous with "Village Blacksmith."

Special (4),—a novelty, of handsome appearance, of excellent quality.

Table King (4),—a second early, forming a valuable market variety.

The Daniels (4),—cross between *Magnum Bonum* and *White Elephant*, combining good qualities of both.

Universal (4),—round white potato; first-rate cropping variety, and excellent keeper.

3. From Messrs. Sutton and Sons' List.

Abundance (4),—excellent disease resisting potato for field crops; superior to *Magnum Bonum* when cooked; useful

Ashleaf (1),—splendid potato, earlier, heavier cropper, shorter in haulm than others of this class.

Best of All (4),—has few equals as cropper; very free from disease; flesh white and excellent when cooked.



Early Eclipse (1),—especially valuable for forcing and early borders; white flesh, excellent shape, short, small haulm.

Early Regent (2),—excellent keeper; disease-resisting; flesh white and floury when cooked.

First and Best (1),—a flattish-round potato; excellent for forcing and early borders; abundant cropper; haulm short and compact.

Magnum Bonum (4),—enormous cropper, of high quality, and almost free from disease.

Masterpiece (4),—tubers round and heavy, with rough skin; flesh firm and white, excellent when cooked; heavy cropper, and disease-resisting.

Matchless (3),—abundant cropper; very free from disease; flesh white, and of excellent quality when cooked; keeps well for winter use.

Perfection (3),—Tubers kidney-shaped; flesh white and of good flavour; cooks well; excellent cropper; haulm strong and erect.

Ringleader (1),—earliest kidney in cultivation; white in flesh, short in haulm; robust.

Satisfaction (4),—splendid cropper; tubers of a thick pebble shape, with rough skin; very free from disease.

Sutton's Seadling (3),—large handsome tubers with russet skin; cooks well, and of good flavour.

Triumph (4),—tubers white, with rough skin resembling the old *Fluke*; enormous cropper; originally raised from *Magnum Bonum*.

White Kidney (2),—disease-resisting; enormous cropper; flesh white; haulm short and compact.

Windsor Castle (2),—may be described as a dwarf *Magnum Bonum*, of erect habit and dark green foliage; flesh white, firm, and of good flavour; excellent cropper.

POTATOES, TRENCHING.

The best mode of planting potatoes, especially if the soil is inclined to be heavy, or has a tendency to dry and harden into cakes and clods in dry weather, is trenching in which the soil is disposed in a series of ridges, is shown in the accompanying diagram. A shallow trench is taken out with the spade about 6 inches deep, and from 20 to 24 inches in width, and the tubers are set along the centre of each successive trench about the same distance apart. The earth taken out of the next trench fills up the trench just furnished with tubers, and prepares the trench for the next row just as the earth from A has filled up B, the earth from

B having filled C, and so on for D, &c. The trenches should run from east to west, if possible, and the soil disposed in ridges so as to present a short, steep slope to the north, and a longer incline at a more gentle gradient to the south. When the young shoots make their appearance above ground, the crest of each ridge affords useful protection to them until they have outtopped it. The soil is lightened by being broken thoroughly and thrown up with the spade, and in this condition permits more readily the entrance of air and moisture.

PUMPKINS.

These are used, when young, as a vegetable. When ripe they form a valuable esculent for soups and "pumpkin pies" in

RADISH.

winter. The young shoots in summer are an excellent substitute for asparagus.

There are several varieties, the names of which may be ascertained from the catalogues and price lists of the leading



TYPE OF PUMPKIN.

nurserymen and seedsmen. One of the latest introductions is "Potiron Jaune," a very large yellow-fleshed pumpkin of American origin, the fruit of which is said to attain a weight ranging from 50 to 80 lb. For culture see *Gourds, Vegetable Marrows*.

RADISH.

If much liked these may be had all the

WHITE TURNIP.
DEHN.WOOD'S EARLY FRAME
LARGE RED RADISH.

year round by sowing in frames from October to February inclusive, and in the open ground during the remainder of the

year. They require a light, rich, loamy soil; and if they are grown on ground that has been manured for the crop that has preceded them so much the better. Sow broadcast, thinly, or in drills from 3 to 4 inches apart for long radishes and the smaller sorts of turnip radishes, and from 4 to 6 inches apart for the larger sorts. Radishes are often sown much too thickly, and this causes the roots to be small, hard, stringy, and disagreeably hot in flavour. Early sowings will require to be protected from frost by a covering of litter, but this must be removed every mild day, as



BLACK SPANISH WINTER RADISH.

soon as the plants appear above ground. When the weather is hot and the ground dry, well water before sowing; and some days before drawing, water the beds well, and keep the soil moist until the crop is finished. The Spanish varieties should be sown in drills, about a foot apart, and thinned out when sufficiently strong to draw, so as to stand from 4 to 6 inches apart in the rows. For a winter supply of these, sow from the middle of July to the middle of September, regulating this by the locality, and the size at which the roots may be most esteemed. Fair-sized roots,

however, will be obtained in most localities from sowings made about the middle of August. These may be taken up before severe weather sets in, and potted or stored in damp sand, in a cool cellar or shed, for winter use.

Culture in Hotbed.—Late-sown radishes—that is to say, radishes sown in autumn—will need protection at night when frosty weather comes on. To make certain of the crop, it is better to grow them in frames, making up for the purpose a bed of manure about 2 feet in depth. Over the hotbed spread light, loamy soil, to the depth of 10 inches, or thereabouts, and then place a two or three-light frame over the bed, as may be convenient. Sow the radishes broadcast, and press in the seed with the back of a rake. This may be done from October to even March, but for sowings in midwinter it will be found necessary to afford auxiliary heat by linings as the heat of the bed declines. Give air on every favourable occasion, so as to secure stocky growth, and cover up at night when frosty. When hotbeds are made in early spring for cucumbers, radishes may be obtained more quickly than in ordinary soil by sprinkling seed on the earth that is without the frame, that is to say, on the soil with which the manure that projects beyond the frame is covered.

RAMPION.

The root and leaves of this plant are both eaten in salads, and in winter, when variety is valued, it forms a valuable addition to the materials in season for salad making. Sowings should be made in March or April for use in autumn, and in May for a winter supply. A rich soil in a shady position is necessary, and the seeds should be sown in drills about 6 inches apart. The plants should be ultimately thinned out to the same distance apart in the rows.

RED BRET. *See Beet, Red.*

RHUBARB.

Although rhubarb is used as a substitute for fruit, and is therefore often regarded as such, it is in reality a very vegetable, and is properly included among plants whose leaves, leaf-stalks, and flowers are eaten.

Directions for the cultivation of rhubarb will be found in the monthly calendars. It will grow without forcing; but it is far better forced. The best kinds for early forcing are the Prince Albert and Linnaeus, which force with less heat than most other kinds. If rhubarb be forced on the ground where it grows, nothing more is required than to cover with large pots and half c



RHUBARB, SHOWING HABIT OF PLANT.

or even boxes, round and over which should be placed plenty of stable manure—by this method it is blanched; but when forced in a frame, or otherwise, it is unnecessary to exclude the light, as there is no advantage in blanching it. Rhubarb may be planted at any time of the year, although mild weather in autumn or early spring is best; it should be planted on a clear open spot on good soil, which should be well trenched 3 feet deep. The plants should be not less than 4 feet apart; or, where it is intended to take up some every year for forcing, a distance of 3 feet will be sufficient. Before planting, a good substance of very rotten manure should be worked

into the soil. When the plants are to be increased, it is merely necessary to take up large roots and divide them with a spade : every piece that has a crown to it will grow ; and as it grows very quickly, this is a good

method of propagating by layers which may be removed in April or May and planted out, or by slips or cuttings taken at the same time, and planted in a situation not too much exposed to the sun. They may be transplanted from the bed in which they have been struck in September or the following April.



LEAF-STALKS OF RHUBARB.

method of propagating it. To insure fine rhubarb, a large dressing of well-rotted manure should be dug in about the roots, as soon as you have finished pulling the leaves. It is not right to wait till the winter before the plants are dressed.

It will be useful to name the following varieties here, although it is *de facto* a vegetable :—

- | | |
|---------------------|---------------------------------|
| 1. Baldry's Scarlet | 6. Kershaw's Paragon. |
| 2. Crimson Em. | 7. Mammoth. |
| 3. Early Red. | 8. Marshall's Early. |
| 4. Hawke's Cham- | 9. Prince Albert. |
| 5. Jahstone's St. | 10. Stott's Goliath or Monarch. |
| Martine. | Victoria. |

ROSEMARY.

Although not used in cookery, should be found in every garden. It may be pro-

pagated by layers which may be removed in April or May and planted out, or by slips or cuttings taken at the same time, and planted in a situation not too much exposed to the sun. They may be transplanted from the bed in which they have been struck in September or the following April.

RUE.

Is a medicinal plant, but is sometimes used for garnishing. It may be propagated from seeds or slips sown or taken in March or April. It is useful as a medicine for fowls when mixed into a paste with a little soot and butter.

SAGE.

This useful garden herb is a salvia, which is a very extensive genus in botany. The sage of the herb bed (*Salvia officinalis*) should be grown in a light rich soil. It is propagated by slips, which may be taken in the autumn, as soon as the plants have ceased flowering, or in the spring of the



year. It may also be propagated by layers in spring or autumn.

SALSAFY.

This root also likes a light, rich soil, and will grow well on ground that has been well manured for the crop that precedes it. The seed should be sown in April, in drills

from 12 to 15 inches apart, and the plants should be thinned out to a distance of from 6 to 9 inches apart in the rows. They will be ready for use in the early part of November, when some of the roots may be taken up and stored for winter use in sand, as recommended for beetroot. It is a biennial, and the stalks that it throws up in its second year, and which will ultimately develop into flowers and yield seed, supply a tender and useful vegetable that is not unlike asparagus. The oyster-like flavour of the root when properly dressed has obtained for it the name of the Vegetable Oyster.

SAVOY CABBAGE. *See* Cabbage, Savoy.

SCARLET RUNNERS. *See* Beans, Runner.

SCORZONERA.

The culture of the scorzonera is similar to that described for salsify, *which see*, but the rows should be from 15 to 18 inches apart, and the plants from 9 to 12 inches apart in the rows. To have it large, it should remain over the second season. It seldom grows large enough for use the first year, but is none the worse for remaining two or even three years before using.

SEAKALE: ITS CULTURE

The best way of raising seakale is from



SALSIFY.

seed, which should be sown in drills, about 3 or 4 feet apart, and 3 inches deep; this should be done about the beginning of April. When sufficiently large to tell which plants are strongest, thin them to about three inches; in July transplant some, leaving them in rows a foot or 18 inches apart. During the summer and autumn the ground should be kept clear of weeds and often stirred; and in dry weather copiously watered, especially that which has been transplanted. Some recommend planting these thinnings on ridges raised a foot high or so, placing the plants in threes or fours, the clusters being a yard apart and



SCORZONERA.

the ridges five feet. It is affirmed that when heat is applied to seakale planted in this way, the ground gets warmed, so that the plants get bottom heat as well as top. There is, however, no actual advantage in this practice; but it is as well to plant them in clumps of three or four together, a yard apart: in this way a bunch of crowns is formed, over which to place a kale-pot, a great advantage in that which is to be forced.

Management.—Seakale is best managed in the open ground, where, if planted on ridges in clusters of three, a yard apart, it may be forced any time in the winter, by putting the pots on, and covering them with about 3 feet of fermenting dung: with

a moderate heat, it takes about three weeks, from the time of covering till ready to cut. Never break off the leaves, but leave them to decay naturally, when they may be removed.

Forcing Seakale.—Treated in the manner described above for asparagus, seakale may be produced as a Christmas vegetable, for it may be put in hotbeds for forcing much earlier than asparagus, indeed as early as November. At the same time, it should be said that January is the best month in which to begin forcing seakale, for if forced earlier, it is neither so good nor so abundant, and if left till March artificial heat is almost unnecessary. In forcing seakale the light should be excluded entirely from the frame, otherwise it will not acquire that whiteness and delicacy which it is desirable that it should possess.

SEEDS FOR KITCHEN GARDEN. See Kitchen-garden Seeds.

SEEDS, STORING.

In collecting seeds the greatest care is required to have them ripe, and that the bags into which they are put are correctly marked. All that is known of the parent plant should be added, if it is other than a common kind, including the soil in which it is found. When collected, before packing away, the seeds should be carefully dried. When they belong to pulpy fruit, separate the grains from the pulp as soon as decomposition begins, and dry before placing them in bags.

SHALLOTS.

Prepare a bed of light, rich soil, with which a liberal dressing of wood ashes, if they can be obtained, and soot has been well incorporated. Rake the surface finely, and even consolidate the soil by beating it lightly with the spade. Then set out the bed in rows 9 inches apart, and place

the bulbs at the same distance apart in the rows, pressing them firmly into the earth until they are nearly hidden by it. In mild situations, sheltered from the north and east, and in warm positions the shallot, like the potato onion, may be planted at midwinter; but it is usual to plant them at the commencement of autumn, or at the end of winter or beginning of spring. The subsequent management is similar to that prescribed for potato onions. See *Onion, Potato*.

SKIRRET.

A perennial plant, sometimes cultivated



ROOTS OF SKIRRET.

for the sake of its fleshy tuberous roots, which are used in much the same manner as salsify. It is propagated by means of the side roots which are taken off from the old roots in spring before these have begun to grow, or by seeds. Skirret requires a light rich soil, and should be planted, or the seed sown, as the case may be, in drills, or rows, from 12 to 15 inches apart and from 6 to 9 inches in the rows. The roots should be lifted and stored at the end of September or beginning of October.

SPINACH.

This excellent vegetable requires a light, rich soil, and plenty of moisture, so much

mend a liberal use of manure water for the summer crop, and this doubtless increases the size of the leaves; but it must not be depended upon to prevent the plants run-



COMMON TANSY.

ning to seed for more than a few days; and while the weather is hot a succession should be provided for, by making frequent sowings. Keep the ground between the lines free from weeds, and in an open state by frequent deep hoeings.

SPINACH, NEW ZEALAND AND PERENNIAL.

The former of these, not being so hardy as ordinary spinach, must be raised in slight bottom heat, and planted out, at the end of May or beginning of June, in light rich soil in a sunny situation in rows, from 30 inches to 3 feet apart, and at the same distance from each other in the rows. It does not require watering like ordinary spinach. Perennial spinach is grown in the same way as red or white beet, which it much resembles in the habit of its leaves, which are stripped from the plant, boiled, and eaten.

SWEET HERBS See Herb Garden.

TANSY.

A perennial herb often found in the present day in old-fashioned gardens, possessed of a pretty feather-shaped leaf, emitting a strong odour and a small yellow bell-like flower. The Common Tansy of the garden, *Tanacetum vulgare*. It is still used in garnishing dishes, but in olden times was utilised for culinary purposes, being an ingredient in Tansy pudding, to which man gives its name.

scribed
state.

TARRAGON.

This perennial requires a light, dry soil, and should be grown in a sheltered position. Propagation by division of roots in March or by cuttings taken in July or August, under a handlight. Cut down at the end of winter, and protect the roots by earth and litter above them.

THYME

This can be increased by dividing and planting out the pieces in a border 4 inches apart, or it may be raised



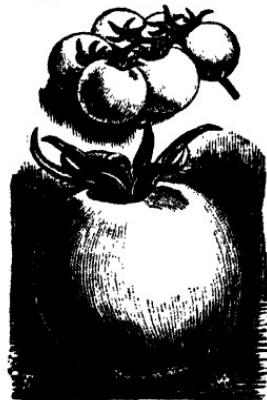
COMMON THYME.

seed sown in light, rich soil in April. It may also be propagated by rooted branches, which may be pegged into the earth at right angles, the manner of layers, and thus induced to

root. April is the month in which old plants should be divided, and rooted branches removed from the parent plant. *Lemon Thyme* is a variety which should be cultivated in every garden on account of its delicious flavour.

TOMATO.

Culture, &c.—Sow the seeds in pots in very rich light mould in March or April, and place them in a cucumber frame, or other gentle heat. When the second leaf appears, re-pot the plants either singly or at most two or three



GOOD TYPE OF YELLOW TOMATO.

together, keeping them near the glass and well watered. In May remove them to a cold frame for the purpose of hardening them before they are planted out, which should be done as soon as the fear of spring frosts is over, and the earlier the better. The best situation for tomato plants is against a south wall fully exposed to the sun. The plants should be well watered with liquid manure to keep up a rapid growth. As soon as the blossom-buds appear, watering should cease. Stop the shoots by nipping off the tops, and throw out all those

sprays that show little signs of fruit, exposing the young fruit as much as possible to the sun and air, only watering to prevent a check in case of very severe



GOOD TYPE OF RED TOMATO.

drought, of which the state of the plant will be the best index.

Ripening Fruit.—In a very dull, wet, cold autumn, even with the greatest care, the fruit will sometimes not ripen as it ought; but in this case it may frequently be made fit for use by cutting off the branches on which full-grown fruit is found, and hanging them in a warm dry greenhouse or elsewhere to soften and



TOMATO, SHOWING HAIRY PLANT.

ripen: a cool oven may be used advantageously to affect this. For varieties, of which there are a great number, the reader is referred to the catalogues of the seedsmen.

TURNIPS—VEGETABLE MARROWS.

TURNIPS.

Preparation of the Land.—A somewhat light, sandy, but deep rich soil, is most suitable for turnips, and is indeed essential to secure bulbs of mild and delicate flavour. If the summer crops sustain any check during their growth, they are apt to be stringy and high-flavoured. Select, then, a deep light soil, manure it heavily, and trench to a depth of 2 feet, early in autumn. If ground must be used for the summer sowings which was not trenched in autumn, this should be done before putting in the seed.

Time and Manner of Sowing.—Sow a small breadth of the Early White Dutch,



STRAP-LEAVED WHITE STONE TURNIP.

for the chance of a crop, upon a south border, or in a warm, sheltered situation, early in March; and as this sowing is liable to run to seed soon, put in a small quantity of the same variety about the middle of the month, and again early in April, sowing a small breadth of the Early Strap-leaved White Stone at the same time. Afterwards sow at intervals of three weeks or a month till July, and for a winter supply from the beginning to the middle of August. On light warm soils, in favourable localities, useful-sized bulbs may be obtained from sowings made early

in September. The Orange Jelly is one of the best varieties for autumn sowing; but if a white-fleshed turnip is required, use Veitch's Red Globe. All the sowings should be made in shallow drills from 12 to 18 inches apart, regulating the distance by the size of bulbs which may be most esteemed: 12 inches will be sufficient for the early and late sowings. Scatter the seed very thinly and evenly, and cover it lightly with the finest of the soil. In summer, when the ground is dry, the drills should be well watered before sowing, and if the seed is steeped in water for twenty-four hours, this will hasten germination.

After-management.—Thin out the plants as soon as they are sufficiently strong to draw, so that they may stand from 6 to 9 inches apart in the row. If fly makes its appearance—and this is very troublesome during summer in warm localities—dust the plants over with quicklime early in the morning, while the leaves are moist with dew. Repeat this operation as often as may be necessary. Keep the surface of the ground open and free from weeds by frequent stirrings with the hoe.

VEGETABLE MARROWS, GOURDS, PUMPKINS, &c.

All vegetables of this class, which produce an immense amount of food, are very profitable, and may be easily cultivated.

Preparation of the Soil.—These require a very deep, light, rich soil, and if planted in the open ground, a sheltered and warm situation. Dig pits 2 feet wide and deep, and fill with well-prepared fermenting manure, and cover about a foot deep with soil. The pits should be from 6 to 10 feet apart, and should be prepared about a week before planting, so that the soil may be properly warmed by the heat from the manure. The tops of compost heaps and hills of decaying leaves, manure, &c., will

however, afford the best possible situation for their growth.

Sowing, and Preparation of the Plants.—Sow early in April, in a pot or pan, filled with light soil, covering the seeds about half an inch; place in gentle heat, and as soon as the plants are sufficiently strong to handle, pot them off into 7-inch pots, putting two plants in each, and replace them near the glass in the warmth. When well established, remove to a cold frame, and gradually prepare for planting out, by a freer exposure to air, &c.

Planting and After-management.—Towards the end of May, or as soon as the weather is warm, and appears to be settled, and the plants ready, plant them out, and protect them for a time by hand-glasses or other means, and attend to watering until the roots get hold of the soil. Train and regulate the shoots, so as to prevent them from growing too closely together, and stop them, if necessary, to forward the growth of the fruit. The plants should not be allowed to feel the want of water at the roots, but if planted in suitable situations, watering will seldom be necessary. Marrows, as it has been said, will grow well when placed on a dunghill, or on any hillock formed of stable refuse and covered over with earth. Being a trailing plant, this position suits it, and the hillock will soon be covered with vines. If the vines are pegged down at a joint, and the joint covered with earth, roots will be sent out from the joint, and will afford fresh channels of nutriment for the plant and its fruit. Vegetable marrows, gourds, &c., may be trained on trellises, fences, &c., on which their broad green leaves, brilliant yellow flowers, and fruits of various forms and colours will present an attractive appearance.

The approved varieties of the vegetable marrow are numerous, but among these it will be sufficient to name the "Bunns"

Marrow, not a trailer, but one of compact habit and bush-like. The "Long White" are the most prolific croppers in the market, and not to be excelled for general use, and the "Custard," bearing small fruit of delicious flavour.

VEGETABLES, CLASSIFICATION OF.

In considering vegetables generally it is useful to seek some kind of classification for them, so that the kinds that belong to each class may be taken in groups. The classification in sections may be most conveniently effected as follows:—1. *Lagenminous Section*, including Peas, Broad Beans, and French Beans, both dwarfs and runners. 2. *Edible Leaved and Flowered Section*, including plants of which we eat the leaves or flowers, or both, being Borecole or Kale, Broccoli, Brussels Sprouts, Cabbages, Savoys, Couve Tronchuda, Cauliflower, Spinach, Asparagus, Seakale, Globe Artichoke, &c. 3. *Edible Rooted Section*, including plants of which we eat the roots or tubers, namely, Beet, Carrot, Parsnip, Turnip, Salsify, Scorzonera, Leek, Onion, Garlic, Potato, Jerusalem Artichoke, &c. 4. *Edible Fruited Section*, or plants of which we eat the fruit, namely, Capsicums and Chilis, Cucumbers, Vegetable Marrows, Melons, Tomatoes, &c. 5. *Salad Section*, comprising Celery, Endive, Lettuce, Raddishes, Corn Salad, Mustard and Cress of various kinds. 6. *The Mushroom*, a nondescript, which cannot be classed under any of the preceding heads, or with 7. *Sweet Herb Section*, including Parsley and all Pot Herbs, and Sweet Herbs, and Herbs in use for garnishing.

VEGETABLES, STORING.

There are several sorts of vegetables which require storing for winter—potatoes, carrots, beet, and onions are the chief of them. Potatoes do best when harvested

in clumps in the open ground, care being taken to protect them from rain and frost. A long ridge is the best form. The ground should be dry and thoroughly drained. The potatoes should be heaped on a ridge, tapering from a base of 3 feet to a foot and a half, or less, at the top, separating the different sorts by divisions in the ridge. It is usual to cover this ridge with a thatch of wheat straw, and then with 6 or 8 inches of mould ; but some authorities highly disapprove of this. McIntosh recommends the tubers being covered with turf, and afterwards with soil ; and in the absence of these, laying on the soil at once without any litter. After having laid on 9 or 10 inches of soil, thatch the whole over an inch and a half thick, with straw, fern leaves, or any similar non-conducting material ; "the object being," he says, "first to exclude frost and wet, and, secondly, to exclude heat ; for which purpose earth is not sufficiently a non-conductor of heat and cold."

If the weather is fine when the tubers are taken up, and the potatoes are required for early use, much of this labour may be dispensed with ; but, if for spring and early summer use, the precautions will be found necessary.

Carrots, beet, and other similar root-crops should be taken up before the frost sets in : they may either be stored in a dry cellar,

covered with dry sand, or after the manner of the potato. The London market gardeners winter their beet and carrots in large sheds, in moderately damp mould, and banked up with straw.

Onions should be lifted a little before they have altogether ceased to grow ; the leaf turning yellow and beginning to fade will be the sign. As they are taken up they should be placed in a dry, airy place, but without being exposed to the sun. If they are thinly spread out on a dry floor or shelf covered with sand, or on a gravel walk partially shaded in fine weather, they will do very well. As they dry, the roughest leaves should be removed ; when dry, they should be removed to a warm, dry loft, where they can ripen more thoroughly. When in a proper state for storing, they should be gone carefully over and separated, the smallest ones for pickling, the ripest picked out, as likely to keep longest ; those with portions of leaves to them are best stored by stringing and suspending them from the ceiling of the room, which promotes ripening. The stringing is done by twisting a strong piece of matting or twine round the tails of each in succession, so that they may hang as close together as possible without forming a cluster, until the string is about a yard long ; when they are hung up they occupy very little room, and have a good opportunity of ripening.

PART IV.

FRUITS: THEIR CULTURE AND MANAGEMENT.

 VERY one who has a garden will of a certainty grow flowers or vegetables, or both, but it is not every gardener who eats of his own figs and sits under the shade of his own vine, or, to use more prosaic language, grows fruit. And yet a little fruit of some kind or another should be found in every garden, however small, and those who are possessed of gardens of any size should have a portion of it devoted to fruit, partly on account of the pleasure that is afforded in watching its progress from blossom to maturity, partly on account of the beauty of fruit trees when in full bloom, and partly on account of the desirability of fruit as an article of food; for fruit should form a prominent item in the daily diet of every one who can grow it or buy it, and should make its appearance on the breakfast table rather than as a supplement to dinner, especially if it be fresh fruit, newly gathered, for fruit, when eaten early in the day, is more wholesome than at any other time, and often saves recourse to medicine by doing similar service in a more pleasant way.

As in the case of flowers and vegetables, all preliminary work as regards the preparation of the ground and the planting and transplanting of trees have been touched on in Part I. of this volume, and all general principles have been sufficiently traced therein, but there is much still to be said with reference to the special treatment of different classes of fruits and the individuals that compose the classes, and all this will be found in the pages that immediately follow. And wherever it is practicable to give such information lists of varieties of individual fruits have been given, and to help those who wish to stock gardens partly or entirely with fruit, the names of sorts that are most likely to afford a desirable collection for all purposes.

Fruits, it may be pointed out here, are variously distinguished according to their modes of reproduction from seed—"the tree yielding fruit whose seed was in itself, after his kind." Thus, apples, pears, and all fruits whose seed consists of what are known as "pips," form one class; then again, peaches, nectarines, plums, cherries, &c., form another class, which are collectively designated "stone-fruits," the edible portion enclosing stones of various forms and sizes, which, on being broken, disclose a kernel, which is the actual seed of the tree, but which, if planted, is protected by the stone until germination takes place, and the pumule and radicle of the incipient seedling burst forth from the enclosing stone, which opens in its natural sutures to allow of their egress. Again, other fruits are known as "bush-fruits," and these notably are the gooseberry, the currant, and the raspberry, whose small, hard seeds are enclosed within the fleshy capsules

INTRODUCTORY.

which contain them, and which either singly, as in the case of the gooseberry and currant, and collectively in the raspberry, form the fruit which is eaten, the seeds in these cases being eaten with the pulp of the fruit.

But all fruits are not subject to the same conditions, and it is not possible to bring every fruit that is grown and eaten under the classification given in the preceding remarks. Thus the strawberry, which, by the way, is known as "ground fruit," from its habit and means of propagating itself by runners or stolons, bears its seed on the exterior of its delicious berry, instead of within, and the mulberry, which is akin to the raspberry as far as the form and growth of the fruit is concerned, is produced on a large, umbrageous tree instead of a slight, erect cane. The nut has an edible kernel enclosed in a hard shell, and grows sometimes singly and sometimes in clusters of two, three, or even four in a husk or capsule, from which it is easily detached when fully ripe. The walnut, like the nut, is enclosed in a husk or capsule, but this entirely envelops the shell that contains the kernel and has its use which the husk of the filbert has not, for it is used in the manufacture of walnut catsup or ketchup, a preparation for flavouring sauces, &c., equally as good as mushroom ketchup, which is prepared in a similar way.

The medlar differs from the pear, which it resembles in form to a great extent, the chief point of difference being in the very large size of the eye, and the apple, too, in having a pip which is extremely hard and more like a stone, and in being uneatable until it is in a state of decomposition. The quince is hard, and is used only when stewed or added as flavouring to apple pie or any preparation of apple; it makes excellent marmalade. The grape bears a semi-translucent berry, or very nearly so, and contains a hard, stony seed of pip-like form. Oranges and lemons contain pips, but these are not chambered in capsules like those of the apple and pear, but are found, more or less in number, in the separate segments of which the fruit is composed when the thick rind is removed.

The pips of apples and pears and the kernels of stone fruits are strongly flavoured with hydrocyanic acid, better known as prussic acid. This is the principle which imparts to laurel leaves the bitter flavour which they possess, and renders these, as well as the kernels of stone fruits, useful in flavouring. The bitter almond possesses this in a remarkable degree, and thus it is that almonds are distinguished as bitter and sweet.

Perhaps the most remarkable of all fruits is the fig, whose inflorescence is contained within the fruit itself, and is never visible until the fruit is opened, and its countless seeds are disclosed to view. Thus the fig is altogether an anomaly, and, as it were, a law unto itself. But here all comment on the peculiarities of fruits must be brought to a close. Peculiarities of growth and training in the trees and bushes that bear them, and the forms that they assume, are noted elsewhere, and therefore do not require mention here.

THE APPLE.

The apple is a somewhat capricious fruit, some sorts affecting clay soils, while others do better in sandy loam, and even in well-drained peat soils. Apple-planting, therefore, requires some discrimination as well as observation as to the sorts most successfully grown in the locality.

Early Dessert Apples.—The following are ten good varieties that ripen their fruit early. They are arranged in order of ripening, and those which are marked with a star in all cases may be planted in cold soils :—

- | | |
|----------------------------|------------------------------|
| 1. Red J uneating. | 7. Worcester Pear-main. |
| 2. Mr. Gladstone. | 8. Prolific or Col. Vaughan. |
| 3. Devonshire Quarrenden.* | 9. Sugarloaf Pippin. |
| 4. Duchess of Oldenburg. | 10. Red Astrachan. |
| 5. Kerry Pippin. | |
| 6. Summer Golden Pippin.* | |

Dessert Apples for Storing.—The following are eight choice varieties for storing :—

- | | |
|---------------------------------------|-----------------------------|
| King of Pippins. | 5. Wyken or Warwick Pippin. |
| 2. Cox's Orange Pip-
pin. | 6. Golden Knob.* |
| 3. Blenheim Orange. | 7. Sturmer Pippin. |
| 4. Gascoyne's Scar-
let Seedling.* | 8. Court Pendu Plat.* |

Cooking Apples for Immediate Use.—The following are the names of twelve good sorts :—

- | | |
|---------------------|--------------------------|
| 1. Early Julien.* | 8. Cox's Pomona. |
| 2. Keswick Codlin.* | 9. Loddington Seedling.* |
| 3. Manz Codlin.* | 10. Grenadier. |
| 4. Cellini Pippin. | 11. Warner's King. |
| 5. Lord Suffield. | 12. Stirling Castle. |
| 6. Old Hawthornden | |
| 7. New Hawthornden. | |

—The following are choice varieties for this purpose :—

- | | |
|----------------------------------|------------------------------|
| 1. Blenheim Orange. | 8. Wellington or Dumelow's.* |
| 2. ... Admi-
rable. | 9. Warner's King. |
| 3. Golden Noble. | 10. Beauty of Kent.* |
| 4. Lord Derby.* | 11. Northern Green-
ing.* |
| 5. Queen Caroline.* | 12. Smart's Prince Albert.* |
| 6. Bells Dubois or Gloria Mundi. | |
| 7. Winter Queen-
ing.* | |

The modern system of dwarfing fruit-trees, by which space is so much economised, is produced by a special course of pruning, commencing a year from grafting, when the apple tree should be pruned back, leaving about eight buds on the shoots. In the second year the head will exhibit eight or ten shoots, and a selection must now be made of five or six, which shall give a cup-like form to the head, removing all shoots crossing each other, or which interfere with that form; thus leaving the head hollow in the centre, with a shapely head externally, shortening back the shoots retained to two-thirds or less, according as the buds are placed, and leaving all of nearly the same size. In the course of the summer's growth the tree will be assisted by pinching off the leading shoots where there is a tendency to overthrow the balance of the head. At the third year's pruning the same process of thinning and cutting back will be required, after which the tree can hardly go wrong. Shoots retained should be short, well-ripened; and in shortening, cut back to a healthy, sound-looking, and well-placed bud. After the third year, little or no shortening back will be required, especially where root-pruning is practised; the tree should now develop itself in fruiting stems, which will subdue the tendency to throw out gross or barren shoots.

Large standard trees in their prime require pruning once in two or three years. At these intervals cross-growing or exhausted shoots, especially those in the centre of the tree, require thinning out, bearing in mind that the best fruit grows at the extremities of the branches, and that these branches must be kept under control.

THE APRICOT.

Apricots, as most other fruit flourish best in a good sound loam.

BLACKBERRIES—BUSH FRUIT.

planting, prepare the soil about a yard deep, and manure with rotten leaves—one part of leaves to four or five of soil.

Place a substratum of brick or other imperishable material below each tree. The apricot, when in a healthy state, produces more natural spurs than most other trees, and although some kinds will blossom and bear fruit on the young wood, yet the chief dependence for a crop of fine fruit must be on the true spurs. In pruning, stop all leading shoots, and pinch off to a few buds all shoots not required to fill up vacant places on the wall. Thin partially all fruit where it is thickly set, but reserve the final thinning until the fruit has stoned. The apricot, and especially the "Moor Park," the finest of them, is subject to a sudden paralysis: first a branch, then a side, dies away, until scarce a vestige of the tree is left; and this generally occurs on fine sunny days in spring and early summer, when the sap-vessels are young, and the sap is easily exuded by a few sunny days. In this state a frost occurs, the sap-vessels are burst by the thawing of the frozen fluid, and the whole economy of the plant deranged. Under these circumstances, which are so often occurring, the injured limb having consumed the sap, can draw no further supply; it yields to the solar influence, languishes and dies. The remedy is to retard, or rather prevent, premature vegetation, and when that can no more be done, to provide protection; for this is recom-

netting made of sedge, of about four-inch mesh, to envelop the main

The following are good varieties for walls or orchard houses under glass:—

- | | |
|---------------|-----------------|
| 1. Breda. | 4. Large Early. |
| 2. Hemakirke. | 5. Moor Park. |
| 3. Kataha. | 6. Peach. |

BLACKBERRIES.

A new candidate for a prominent place

in the fruit garden has lately been introduced in the blackberry, of which the following are the best cultivated varieties:

- | | |
|---------------------------|------------------------------|
| 1. Snyder. | 7. Early Harvest. |
| 2. Parsley Leaved. | 8. Taylor's Prolific. |
| 3. Stone's Hardy. | 9. Wilson's Early. |
| 4. Wachusett's Thornless. | 10. Wilson Junior. |
| 5. Brunton's Early. | This last is the best |
| 6. Mammoth. | of all the cultivated kinds. |

There is no difficulty in the culture of the blackberry that requires special mention here, but it may be as well to remind the reader that in attempting to grow any of the cultivated sorts disappointment, through failure of the plant to take kindly to its new quarters, will often occur. The best course to pursue, when ordering any from the grower, is to make him acquainted with the nature and character of the soil in which they are to be placed, and to leave the selection to him.

BUSH FRUIT.

Under this title are included gooseberries, the different kinds of currants—red, white, and black—and raspberries; fruits so extremely useful that they are to be found in every garden, and are grown extensively for markets in the neighbourhood of every large town. It too frequently happens that bush fruit, from the readiness with which it yields a crop, is left to take care of itself; but the quantity and quality of the fruit produced will be found to depend very materially upon the good management of the bushes. Directions for the culture of the different will be found under the different heads respectively.

In forming plantations amateurs must keep in mind that it is a mistake to plant bush fruits, such as gooseberries and currants, too closely together. The rows should be at least six feet apart, and the bushes should be the same distance apart in the rows. Of course there will be a

lingering idea in the amateur's mind, when he sees small and young bushes planted out in this way, that the ground is unduly wasted. But the bushes grow quickly; and if he is overdistressed on account of the imaginary waste, he may set temporary crops along the centre lines between rows and bushes until such time as the latter have attained about half their size, when the intermediate cropping should be abandoned.

MANAGEMENT OF CUTTINGS OF BUSH FRUIT.

To grow currants, and gooseberries too, in perfection a deep and tolerably rich soil is required; and, preparatory to planting, this should be deeply trenched and manured with thoroughly rotted dung. Both are propagated by cuttings, which should be well-ripened wood of last year's growth, slipped from the tree, and from ten to twelve inches long. Having selected the slip and separated it from the parent stem, cut off the top, leaving four shoots; trim off all others. Make two or three incisions, penetrating half through the stem, to expedite the process of rooting, and plant the cuttings in a nursery-bed in rows a few inches apart each way. When the cuttings have made roots, transplant them into a bed of deeper and richer soil, pruning back the four shoots to five or six

and leaving two side shoots to each. Here they may remain a second year, the four shoots now multiplied to eight, and the head beginning to assume its permanent shape. This is produced by means of hooked sticks, by which straggling shoots are brought into cup-like form, and forked twigs, by means of which shoots inclining inwardly are pressed out to their proper position, which should be as nearly the horizontal as possible.

Treatment in Second Year of Growth.—In the autumn of the second year the

bushes may be planted out in their permanent stations, which may be from three feet and a half up to seven or eight feet apart, according to circumstances; that is, if it is a plantation entirely devoted to well-selected bush-fruit, in which no other crop is to be cultivated, three feet and a half, or four feet, will do, but six feet is better. If they are planted with the intention of growing other crops between them, six feet to eight feet will not be too much. Where they are planted in rows to divide the quarters of the kitchen-garden, six feet will probably be a convenient distance. In planting, dig out the soil eighteen inches deep, and of sufficient diameter to admit of the growth of the roots; smooth and level the station with the back of the spade, and drive a stake firmly into the ground in the centre, leaving it six or seven inches above the surface of the soil. Having trimmed the roots of the bush, place it in the centre of the station with the roots radiating in all directions, regularly spread out, none of them spreading over others, and sprinkle two inches of the soil over them, pressing it gently all round into the roots; over this spread a thin layer of well-rotted dung, and fill up the whole to the level of the surrounding soil. This done, water the roots well, and prune back all the shoots so as to form a cup-like bush, with branches radiating from the centre.

Fruiting Wood.—Gooseberry and currant bushes produce their fruit both on the young wood and on the wood two, three, and four years old; and generally along the branches. The general bearers, therefore, young and old, of proper growth and well ripened, must be continued as long as they remain fruitful, cutting out from time to time such as are of irregular growth or too crowded,—all branches and decayed wood, together with the superfluous or over-abundant young wood of last summer; but retaining a selection of young

shoots where necessary, to fill up gaps in the tree; the rule being to keep them trained to a single stem below, while the head, or general expansion of branches, is kept open and regular.

CHERRY.

The chief varieties of the cherry are the Kentish, Duke, and Morello, and from these it is supposed that all others have originated. The first named and those derived from it are the best for cooking purposes; the Duke, and the sorts obtained from it, for eating; and the Morello for preserving and making cherry brandy, for which purpose the Kentish is also used.

Propagation and Training.—The cherry is propagated by budding on stocks usually obtained from the stones of the wild black cherry, or in the case of standards by grafting on stocks of the wild cherry. Trees for training on walls are generally worked on the St. Lucie plum. Its treatment, like that of the plum, is precisely the same as that laid down for the training of the pear. (See *Pruning* generally). It may be grown in any form.

Soil, &c.—The soil best suited for the cherry is a rich deep loam, well drained, and with a dry subsoil. Cherries for the table, if planted against a wall, should have a southern aspect; but the Kentish and Morello Cherry will bear well and ripen their fruit on a north, north-east, or north-west wall. On walls careful training is necessary, but for orchards the best form is that of the standard or pyramid.

CHERRIES, VARIETIES OF.

The following are excellent varieties of cherries, arranged, as far as possible, in the order of ripening:—

- (1) WHITE HEART, EARLY.
1. Frogmore Biggareau.
2. Elton Heart.
3. Governor Wood.
4. Adam's Crown Heart.

- (2) WHITE HEART, LATE.
1. Kentish Biggareau or Amber.
2. Biggareau Napoleon.
3. Large French Biggareau.

- (3) BLACK.
1. Werder's Early Black Heart.
2. Old Black Heart.
3. Black Cluster or Carone.
4. Black Biggareau.

- (4) RED OR MORELLO.
1. Kentish.
2. Flemish.
3. Morello.

COTTAGE GARDENS, FRUIT CULT.

Of this it is not possible to write length. Careful planting in November, with secure staking, protection from biting winds from the north and east—especially in early spring, when the trees bloom—sedulous watering of trees recently planted or giving promise of a heavy crop of fruit, judicious pruning above ground and below also, when the growth is luxurious, and the tree makes too much wood, and is shy of bearing, so as to induce the making of fibrous roots, are the cardinal points of the whole duty of cottage gardeners. In small gardens the trees will naturally be isolated, and stand here and there, and it is desirable that trees of the pyramid form, or to be worked as espaliers, should be planted, because large standard trees overshadow the ground too much, and cast a shade that does no good to vegetables below and near them. Bush fruit and strawberries are most worth the attention of the small grower; but where the ground is of sufficient extent, a portion may be devoted to the growth of pyramid trees, which may be planted nearly as closely, and will take up little more room than good-sized gooseberry bushes. The following affords a list of trees, bush fruit and ground fruit, best suited to the requirements of the cottage gardener. Apricots, peaches, and nectarines are included; but he will not grow these unless he places them against a sunny

wall of his dwelling, or garden wall, with southern aspect, if he has it.

APPLES (DESSERT).	Rivers's Early Prolific.	Lancashire Lad.	Carter's Prolific.
<i>Early.</i>	Greengage.	Yellow Rough.	Fastolf.
Red Juneating.	Magnum Bonum.	Rifeman.	Red Antwerp.
Devonshire Quarrenden.	Prince of Wales.	Whinham's Industry.	White Antwerp.
Terry Pippin.	Jefferson.		Northumberland
Worcester Pear.	Cox's Emperor.		Filmbasket.
—ain.	Coe's Golden Drop.		Lord Beaconsfield.
Red Astrachan.	Farleigh's Prolific		Baumforth's Seedling.
Stubbard.	Damaon.		
<i>Late.</i>	Kentish Cluster.		STRAWBERRIES.
Cox's Orange Pippin.	VINES.		Garibaldi, or V. Hericart de Theury.
Golden Knob.	<i>Outdoors.</i>		Black Prince.
Court Pendu Plat.	Royal Muscadine.		Keen's Seedling.
—Scarlet	White Sweetwater.		Laxton's Noble.
—Seedling.	Black Cluster.		Dr. Hogg.
Blenheim Orange.			President.
Ribston Pippin.	<i>With partial protection.</i>		James Veitch.
King of Pippins.	Foster's Seedling,		Sir Charles Napier.
Scarlet Nonpareil.	white.		
APPLES (COOKING).	Black Hamburg.		
<i>Early.</i>	CHERRIES.		
Iluni Pippin.	<i>Early.</i>		
—rd Suffield.	May Duke.		
—d Hawthornden.	Frogmore Biggareau.		
Loddington Seedling.	Elton Heart.		
Grenadier.	Early Heart.		
<i>Late.</i>	Early Black Heart.		
Blenheim Orange.	Black Heart.		
Winter Queening.			
Wellington or Dumelow's.	Kentish Biggareau.		
Northern Greening.	Kentish.		
Norfolk Beaufin.			
PEARNS.			
<i>Early.</i>			
Doyenne d'Ete.	Morello, for Cherry Brandy.		
Lammas.			
Jargonelle.			
	APRICOTS.		
	Moor Park.		
	Breda.		
	Large Early.		
	PEACHES.		
	Early York.		
	Grosse.		
	Mignonne.		
	Noblesse.		
	Royal George.		
	NECTARINES.		
	Pitmaston Orange.		
	Violette Native.		
	Victoria.		
	Large White Smith.		
	Early Sulphur.		

CURRANT, CULTURE OF THE.

Currants, red and white, may be pruned in the same manner as gooseberries (see *Gooseberry, Culture of the*), but black currants require a different treatment. In managing the cuttings, proceed as directed for gooseberries. Plant out the second year, when the cuttings have eight inches of stem and about five leading shoots.

Pruning and Training.—The pruning of both red and white currants is very different from that of gooseberries. When the requisite number of branches has been produced, so as to form a uniform bush, the greater part of the young shoots should be taken off annually, leaving only those that may be required for new branches, and shortening these to four or six inches with a clean cut just close to a bud. In pruning off the superfluous lateral shoots, take hold of each branch at its extremity with the left hand, and, with the knife in the right hand, remove every fresh lateral up the stem, leaving to each a short spur of a quarter or half an inch in length; from these spurs the bunches of fruit are produced. As the bush increases in age, it will be necessary to remove all old mossy wood, and also to thin out the spurs when they have become too crowded.

Of late years, great improvement has been made in both red and white currants. Visitors to Covent Garden market frequently express surprise as to the size of the bunches and the berries. These currants are not only peculiar sorts, but very great pains are taken in the cultivation of them. To grow fine currants, make the plantation in an open sunny position on a stiff, well-manured loam; plant the bushes five feet apart each way, and every autumn trench in a good dressing of half-rotten manure in such a way as not to injure the roots of the trees. At autumn-pruning all the young shoots must be cut in to two inches.

Currants with White Fruit.—The sorts which produce the largest fruit are White Blanche, with amber-coloured berries, and White Dutch, the best white currant that is grown. In addition to these may be named Wilmot's Large White, which is a distinct variety and yields well, but has not such a hold on the growers, and is therefore not in such repute as White Dutch.

Currants with Red Fruit.—Of red currants, Cherry is the largest; La Fertile and Knight's Large Red are also excellent varieties. There are, beyond these, Houghton's Seedling or Houghton's Castle, a large variety with dark-red berries of a highly acidulous flavour; La Hatitive, an early variety with large and delicious berries; Mammoth, with very large fruit, as its name implies, of excellent flavour; Raby Castle, a late variety with highly acid fruit, as all late varieties seem to be; Red Champagne with berries rather pink than red; Red Dutch, early and highly productive, with well flavoured juicy berries; and Warner's Grape, also a desirable variety, yielding long and large clusters of berries, rich in juice and flavour.

Currants with Black Fruit.—The cultivation of the black currant is almost the same as the gooseberry (see *Gooseberry*,

Culture of the), and the pruning is the same, only not so severe, as the black currant does not form so many young shoots. All dead and unproductive wood should be removed each year, and the shoots thinned so that light and air may freely enter the bush. Black currants are best left to grow as bushes; they do not thrive well trained to walls, or as espaliers. The best varieties are the Naples Black and Ogden's Black; both of which, under good culture, are profuse bearers, and very large. Lee's Prolific is a variety of comparatively recent introduction, with large bunches of sweet and well-flavoured berries of considerable size. Sweet Fruited is a fourth variety, whose fruit will hang on the bushes for a considerable time if netted. The latest and best, perhaps, is Carter's Black Champion, the finest and best cropping black currant in cultivation, possessing the great merit of the fruit hanging on the tree until shrivelled. The bunches are long, and the berries very large, tender, and richly flavoured.

FIGS.

Almost any well-drained soil will suit the fig-tree when grown in the open air. Care, however, must be taken that it is not too rich, for if so, the tree will not produce fruit. Three sorts of figs are usually grown—the Brown Turkey, Brunswick, and Black Ischia: all require a wall and a sunny situation. The best mode of training is perpendicular. Fix to the wall as many permanent leaders as are required at from 10 inches to 15 inches apart; get rid of all unnecessary wood by disbudding, and stop the fruit-bearing shoots at the end of August or beginning of September, according to the habit of the tree and the nature of the season. This operation is performed by merely pinching off or squeezing flat the terminal growing-point. This

stopping, the object of which is to induce the formation of fruit for the ensuing season, is a matter of much nicety. A too early stopping with most trees will cause a too early development of fruit, the consequence of which will be that it will not stand through the frost of winter. The fruit for next year must not be much larger than a pea when winter sets in.

Instructions for the proper treatment of figs under glass will be found in the calendars of the months.

FIGS, LIST OF.

Of the different varieties in cultivation the following, perhaps, are the most useful :—

Black Ischia.*	Castle Kennedy. (4)
Brown Ischia.*	Malta.*
White Ischia.*	Col de Signora
Brown Turkey. (3)	Bianca.
Marseilles White. (1)	Gross Monstreuse.
D'Agen.	St. John's.*
Osborne's Prolific. (3)	

Of these the varieties marked with a star force readily and are therefore good under glass. The Brown Turkey is the finest for outdoor culture ; Osborne's Prolific is excellent for pot culture and Castle Kennedy is extremely hardy.

The trees may be introduced into orchards, shrubberies, plantations, or hedgerows. Planted close to each other, they form valuable screens or shelter in exposed situations. A filbert-walk is a great addition to any garden. Filberts are not merely ornamental but profitable. They will thrive almost anywhere, and are much improved by pruning.

The following list of filberts and cob nuts is taken from the catalogue of Mr. Cooper, F.R.H.S., Calicot Gardens, Reading, who is a specialist in this class of fruit :—

1. Webb's Prize Cob Filbert.	8. Eugenie.
2. Emperor Cob.	9. Marquis of Lorne.
3. Improved Cosford Cob.	10. Princess Royal.
4. New Cob Davi- ana.	11. Garibaldi.
5. Prolific Close Head Filbert.	12. Kentish Cob.
6. Red Skinned Filbert.	13. Duke of Edinburgh.
7. White Skinned Filbert.	14. Duchess of Edinburgh.
	15. The Shah.
	16. Cannon Ball.

FRUIT: HOW AND WHEN TO GATHER IT.

Fruit gathering is one of the most cheerful and agreeable employments connected with garden management. It usually enlists every hand in its service, and in an abundant year finds all hands plenty to do. To the following plain and simple directions, those who are entrusted with the superintendence of fruit-gathering will do well at all times to attend.

Maturity of Fruit.—It is important, in the first place, to remark that no fruit should be gathered for storing before it has arrived at maturity. By this we are to understand not necessarily its full flavour and ripeness, but the completion of growth or size ; and as all fruit, even upon the same tree, does not come to the same period, it will frequently be found the safest and most economical plan to make the gathering at two or three different times. It is very easy to ascertain when any particular fruit is ready ; for ripe fruit always leaves the tree upon a gentle touch—the fruit-stalk parts from the twig on which it grows without any sign of rending or violence.

Windfalls.—In a general way, with both apples and pears, several of the most forward fruit will have fallen before the general crop is in a fit state to be gathered ; and this fallen or bruised fruit should never be mixed with that which is intended to be stored ; all unsound fruit which may be

found upon the trees at the time of gathering should also be rejected.

When to gather.—Fruit, in fact, which ripens in summer and autumn, should be gathered a little before it is absolutely ripe : thus gathered, it is better in quality and higher flavoured than when absolutely ripe. But this must not be carried too far. A single day before they are perfectly ripe suffices for peaches and other delicate stone fruit ; a week for apples and pears ; but cherries are only gathered when completely ripe. Apples and pears, which arrive at complete maturity in winter, are best gathered at the moment when the leaves begin to fall, and the sap to withdraw from the branches in October.

Weather for Gathering.—All gathering should take place in dry weather, and the fruit should not be handled or pulled about more than is absolutely necessary. The middle and afternoon of the day will usually be found the best time for gathering, as autumn mornings, even in the finest weather, are always more or less humid ; and to avoid any risk in keeping, all fruit should be quite dry before it is taken from the tree.

In what to gather.—The most convenient baskets for fruit-gathering are peck and half-bushel baskets, with cross-handles. These should be provided with line and a hook, by means of which they may be hung to the branches of the tree, and thus allow the gatherer the liberty of using both his hands : by the line, the baskets, when full of fruit, can be lowered to be emptied, and drawn up again.

FRUIT: MODES OF STORING IT.

The following statement appears to embrace the best methods, and those that are most generally adopted, for the storing and preservation of fruit :—

1. Apples and pears may be sweated—*i.e.*, laid in heaps and left to heat, and then

stored away in an apple-room on dressers, or in a dry dark vault in heaps, uncovered except during frost.

2. Fruit may be stored on open shelves and on the floor of a fruit-room, spread out upon straw, and covered, when necessary, with the same material.

3. In the same way, but upon dried fern-leaves, and with fern-leaves for a covering.

4. In baskets or hampers, lined with straw or fern-leaves, but without any material between the layers of fruit.

5. In boxes or casks, with sawdust.

6. In boxes or casks, with bran.

7. In boxes or casks, with wheat-chaff, or with oat-flights.

8. In boxes, with dry sand between the fruit.

9. In boxes, with powdered charcoal in the same way.

10. In jars, without any material intervening between the fruit : the jars, when covered with a piece of slate or tile, to be buried in dry sand of a depth sufficient to exclude all air and to ensure preservation from frost.

11. In deep drawers, one upon another, without any substance between them.

12. In deep drawers, with sheets of paper or dried fern-leaves placed between the layers of fruit.

13. In single layers in shallow trays or drawers, resting upon fern-leaves, and to be covered when necessary with the same.

14. In heaps in dark, dry, well-aired vaults.

Filberts and walnuts, to be stored for winter use, should be gathered when full ripe, and on a dry day. They should then be cleared of their husks and packed in glazed earthen jars, tied down with coarse brown paper, and kept in a damp cellar.

DWARF FRUIT-TREES.

Modern fruit-gardens may be described as orchards in miniature. Certainly they

are more manageable, doubly interesting, and equally productive with orchards. To make good dwarf trees, work apples on the Paradise or Doucin, otherwise French, stock from layers, pears on the quince, and cherries and plums on the smallest stocks that can be procured. Careful summer stopping, root-pruning, and the pyramidal form will enunciate the main features of their treatment and training; and abundance of good fruit will be the result. The trees may be planted in rows from 7 to 10 feet apart, and the same distance between each plant. On good soils they succeed well on the level of the ground; on heavy clays, or other unfavourable bottoms, the ground can be thrown into ridges or mounds. The space between these mounds may be occupied with standard gooseberry or currant—these bear admirably trained with a single stem in this manner; and the sides of the mounds can be cropped with salading. A fruit-garden thus formed is quite a scene of beauty when the trees are in flower, and very enjoyable at all times.

FRUIT TREES: HOW TO PLANT THEM.

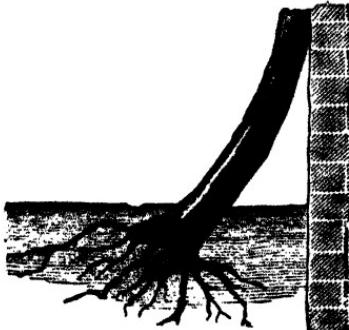
Time.—The time for planting may be in any month from October to February inclusive, but many arguments may be brought forward in favour of the month of November, if the weather be open and free from frosts. Spring is always a busy season in the garden, and digging, sowing, grafting, and pruning are then in full operation. Planting, without doubt, is best performed in November, for every kind of deciduous tree and shrub, and for most evergreens, although it is possible, with care, to plant and transplant evergreens in almost every month in the year. Whatever variety of opinion may exist in reference to evergreens, there is no doubt whatever that the planting of all deciduous trees, fruit-trees included, and shrubs, should cease by the middle of December.

This work should therefore be pushed forward in mild weather. One great point of success is to keep the roots of the plants as little exposed as possible: a dry wind, or a cutting, frosty air, is fatal to them. The tops of plants are endowed, even when in a dormant state, with a wonderful power of resisting cold. As Nature never intended the roots to be exposed, and does not needlessly squander her resources, it is obvious that this power of resisting cold is not extended to them. Therefore, all newly-planted shrubs and trees should also have their roots protected during the first winter with long litter, to prevent their being injured. The next point of importance in planting trees or shrubs, especially of large size, is to firmly secure the top to a strong stake, or by any other method, so as to keep it immovable in one spot. When it is otherwise, the trees, both top and root, are the sport of every fresh breeze; and the probability is, that after the roots have made a feeble effort to grow, and been forcibly wrenched from the soil, they will perish.

Preparation of Stations.—In preparing stations, therefore, suitable soils should be supplied to each. The station is prepared by digging out a pit about 3 feet square, and the same in depth, in ground that has been well drained. In the bottom of this pit lay 10 or 12 inches of brick or lime rubbish, the roughest material at the bottom, and ram it pretty firmly, so as to be impervious to the tap-root; the remainder of the pit must be filled in with earth suitable to the requirements of the tree. When the surrounding soil is a tenacious clay, the roots of the young tree should be spread out just under the surface, and rich light mould placed over them, forming a little mound round the roots; but in no case should the crown be more than covered: deep planting is the bane of fruit-trees.

Preparation of Trees for Planting.—The

stations being prepared, and the trees having arrived, it is necessary to prune the roots, by taking off all the small fibres, and shortening the larger roots to about six inches from the stem ; and if any portion of the roots has received any bruise, or been broken before the trees have reached their destination, that part of the root should be removed entirely, by a clean, sharp cut. Two or three spurs are sufficient, but if there be more good ones, they may remain, after being carefully pruned. The rapidity of railway conveyance will prevent injury to the trees, especially if



MODE OF PLACING TREE IN POSITION AGAINST WALL.

they are carefully packed in mould and matted ; but it may be a proper precaution against carelessness at the nursery if the roots are laid in milk-and-water or soap-suds a few hours before they are planted.

Process of Planting.—The process of planting will differ, according as it is intended to be a dwarf, a standard, a pyramid, or a wall tree. If for a dwarf, standard, or espalier, after cutting away the tap-root, except in the case of the peach, which, having a tendency to throw up suckers, should have the roots directed downwards, place it upright in the centre of the station : spread the roots carefully in a horizontal direction, and cover them

with prepared mould to the required height, supporting the young plant with a strong stake, driven firmly into the ground, and tying the stem to it, after surrounding the stem with hay or straw, or even a wrapping of old felt carpet, so that the string may not bruise the young tree or cut into the bark, pressing the soil gently, but firmly, over the extended roots. When the operation of planting is finished, cover the ground all round the tree with a layer of half-rotten dung. This process, called mulching, consists in spreading a layer of short half-rotten dung 5 or 6 inches thick round the stem, in a radius 6 inches beyond the extremity of the roots. The mulch should be spread evenly with the fork, and gently pressed down by the back of the spade, or, if exposed to wind, pegged down to prevent its being blown away. If a wall tree, let the root be as far from the wall as may conveniently be, with the stem sloping to it, the roots being extended and covered in the same manner with the soil. The way in which this should be done is shown in the accompanying illustration. The object is to give the roots as much room as possible in which to ramify.

FRUIT-TREES: HOW TO TRAIN THEM.

Broadly speaking, trees may be grown *without* artificial supports, or *with* them ; and taking this general view, we find that the trees that are grown without artificial supports are the apple-tree, the pear-tree, the cherry-tree, and the plum-tree. Under this condition, the forms assumed by these trees are the *standard* and the *pyramid* or *bush* form, the former being more suitable for culture in isolated positions or in orchards, and the latter for gardens and smaller areas of ground and for orchard houses. All the trees mentioned, and the peach, the apricot, and the cherry, may be grown by aid of artificial supports, but peaches, nectarines, and apricots require

the shelter and warmth afforded by a wall with a south aspect, to enable them to bring their fruit to perfection when grown in the open air.

When recourse is had to artificial support, it assumes the form of a vertical stake or a horizontal line, either singly or collectively, or of a plane surface, though,

wire on what is called the *cordon* system, a system which may be carried out with equal facility on walls, or they may be trained on a plane surface, with branches radiating from the main stem on each side of it.

FRUIT-TREES: THEIR TREATMENT.

The following table will be found useful

FRUIT TREE.	SOIL.	MODE OF PROPAGATION.	TIME.	HOW GROWN.	ASPECT.
Apple.	Rich, moist soil, or cool, sandy soil, of medium consistency.	Grafting on stocks from pips, or on Paradise stocks from layers for dwarf trees, Cordon, &c., or on Doucain or French Stocks also from layers.	March and April.	Standard, Pyramid, Espalier, &c., trained with horizontal branches on stakes or wire; Single or Double Cordon, also horizontal.	Any aspect; does best in open.
Apricot.	Clay soil, open and calcareous, and not deep.	Budding on plum stocks.	July and August.	Pyramid in Orchard House; Fan or Oblique Cordon on wall.	Any aspect from east (by south) to west.
Cherry.	Dry and light sandy loam on dry sub-soil, or chalky soil with chalk subsoil.	(1) By budding on small stock or St. Lucie Plum. (2) By grafting with Cleft or Crown graft on wild cherry stock.	(1) July & August. (2) March.	Standard, Pyramid, Double Vertical Cordon, Single Oblique Cordon and Fan.	Any aspect, but chiefly east, west, and south for trained tree
Peach and Nectarine.	Open soil, deep, fairly consistent, calcareous, and not too moist.	Budding on plum stock.	July.	Pyramid or bush in Orchard House; Fan and Single Oblique Cordon on wall.	South-east is best, but any aspect from east to south-west will do.
Pear.	Deep clay soil, containing flints, cool, but not too moist.	(1) Grafting on stocks from pips or on quince stocks. (2) By budding on smaller stock.	(1) March and April. (2) August.	Standard, Pyramid, Espalier, Fan, branches horizontal; Vertical and Oblique Cordon, single and double.	Any aspect, but east and west are most suitable for trees trained on walls.
Plum.	Clay soil, open and calcareous, and not deep.	(1) Budding on plum stock. (2) Grafting on plum stock.	(1) July. (2) March.	Standard, Pyramid, Fan, and Single Vertical and Oblique Cordon.	Any aspect, but chiefly east, west, and south for trained trees.

in point of fact, a row of vertical stakes set in a line, or a series of horizontal wires one above another, are tantamount to a vertical plane surface as presented by a wall. But this brings us to the fact that trees may be trained on a single horizontal

in providing in a small compass a synoptical view of the soil that is liked best by each kind of fruit-tree that is adapted for training, and other particulars with respect to its culture, propagation, training, aspect, &c.

GOOSEBERRIES.

GOOSEBERRIES.

Gooseberries bear on the young as well as on the two-year-old wood, generally upon small spurs rising along the sides of the branches. In pruning gooseberry-trees, for which January is a favourable season, keep the tree thin of branches: but let those left be trained to some regular shape, and never permitted to grow across each other, radiating in a cuplike form, so as to be 6 or 8 inches apart at the extremities and hollow in the centre. Prune away all worn-out branches, retaining young shoots to supply their places, retaining also, where practicable, a terminal bud to each branch, while shortening stragglers. The same remarks apply to currant-trees. Young gooseberry-trees designed for standards should be pruned back to a clean stem for 10 or 12 inches, retaining the best-placed shoots to form the head, and keeping these, as nearly as possible, in the same length and form.

In making new plantations, place the bushes 8 feet apart each way, if in continuous rows; if into quarters, or to divide the ground into compartments, prune them up to a clean stem 12 or 14 inches high; otherwise the foliage will impede the growth of the crops sown beneath them. Perhaps the best mode of growing gooseberries is as standards; in which case the bushes should be trained 3 feet high before they are suffered to form a head. According to the ordinary system of training, the branches are often borne to the ground by the weight of the fruit, which is destroyed by being draggled on the soil and splashed by heavy rains. For further information on the culture of the gooseberry and a list of the best varieties, see *Bush Fruit*.

CULTURE OF THE GOOSEBERRY.

Though the gooseberry will grow on the poorest soil, it will not produce fine fruit

unless planted in a deep, rich soil, and treated generously. Though hardy, it requires moderate shelter, and though rejoicing in moisture, it will not flourish in undrained land.

Cuttings, Management of.—Cuttings should be planted any time from October to March. Select for the purpose shoots of a medium size, not root-suckers, about a foot or more in length. Cut the base of the shoot square; no fruit canes should ever be planted with slanting heels; after this, remove with a knife every bud from the base to within two inches of the top. If the cuttings are fifteen inches long, and four heads are left at the top, the future stem will be a foot high, which will be ample for a useful tree. The lower buds are removed in order to secure a clean stem and prevent the formation of suckers. Plant the cuttings in the shade four inches deep, and fix the earth firmly about them. During summer, young growing shoots strike readily under a hand-glass on a shady border, and a season may frequently be saved in this way.

Pruning and Training.—The first season's growth of cuttings put in in autumn should be very little interfered with. If any pruning is requisite, it is best done by rubbing off buds and by pinching in shoots which would interfere with the proper shape of the bush. At the end of the season cut back all leading shoots to two-thirds of their length, so as to cause them to break next spring and form well-shaped bushes. At first, it is frequently desirable to plant cuttings only a few inches apart, and after the second year's growth to plant them out finally about six feet apart. Each bush would then have about eight leading shoots to form a head, and must be kept in shape and order by yearly prunings. If large fruit is required, it is not desirable to shorten the shoots, except they grow too

vigorously and incline too much downwards. Weak and superfluous shoots should be removed, and this is best done by taking them off as close as possible to the old ones, and removing all bottom buds, so as to prevent the formation of too many young shoots. The trees may be trained in many ways: sometimes the form of a fan or an espalier hedge is adopted, which has the advantage of being easily netted if birds are troublesome. The cup and funnel shapes are especially suited for the production of fine fruit, as air may be admitted to the centre of the trees.

Protection of Fruit.—The best plan of protecting fruit from birds is by encircling the bush with wire netting, and covering the top with a piece of string netting, which can be removed when the fruit is to be gathered. The ordinary bush form can be protected in the same way.

With regard to the selection of sorts, it may be as well to mention, first of all, the sorts that were most in vogue and chiefly in favour in the time of so good a judge as the late Mr. Shirley Hibberd. The best of the old varieties, he tells us, still hold their ground. There are none equal to the Champagne for flavour. The Red Champagne is of the same quality, differing only in colour. The old Rough is the best for preserving, and Warrington is unequalled as a profitable late gooseberry. For early work, take Golden Drop, Ostrich, and Early Green Hairy. For the latest crop and for retarding, the best are Warrington, white; Viper, yellow; Pitmaston, green; and Coe's Late Red. The most profitable sorts are Keen's Seedling and Warrington, red; Globe and Husbandman, yellow; Profit and Glenton, green; Eagle and Wellington Glory, white. For large exhibition berries, the following are a few of the best established sorts:—*Red:* Companion, Slaughterman, Conquering Hero,

and Dan's Mistake. *Yellow:* Leader, Leveller, Goldfinder, Peru, Catherine. *Green:* Thumper, Gretna Green, Rough Green, General, and Turnout. *White:* Snowdrop, Antagonist, and Lady Leicester. The Lancashire gooseberries, which are generally distinguished by long, drooping branches, bear the largest fruit. Seedlings have been shown at Manchester varying in weight from 20 dwt. to 26 dwt., and, we believe, even beyond this. Such fruit, however, is generally produced at the expense of the crop. When fruit is to be gathered green, it is most profitable to keep the bush as thick in shoots as possible; for ripening fine fruit, the more open the bush the better.

After this, as constituting the most modern and complete list that we can have, it will be useful to put the reader in possession of the names of the choicest fruits of this class compiled from the "Illustrated Dictionary of Gardening," edited by Mr. George Nicholson, of the Royal Botanic Gardens, Kew. The four lists of red, yellow, green, and white, are necessarily abbreviated, and none of the fruits mentioned above are repeated, but the character of each individual kind has been noted as given in the authority quoted.

1. Gooseberries with Red Skin.

- Crown Bob; bright red, of good flavour, roundish oblong, hairy.
- Dr. Hogg; purplish red, long, broad, downy.
- Henson's Seedling; deep red, medium, of good flavour, very hairy, late.
- Ironmonger; dark red, small, hairy.
- Lion's Provider; light red, long, a little hairy.
- London; dark red, very large, roundish oval, smooth.
- Miss Bold; light red, medium, very downy, early.
- Monarch;
- Plough;
- smooth,
- Raspberry;
- Red Turkey;
- late.
- Rifema;
- Wilmot;
- Wonderful; purplish red, very large, smooth.

GOOSEBERRIES.

Gooseberries with Yellow Skin.

- Broom Girl**; large with long stalk, dark yellow, hairy, early.
Criterion; greenish yellow, medium, a little hairy.
Drill; greenish yellow, large, long, smooth, late.
Early Sulphur; bright yellow, medium, very hairy, early and abundant.
Fanny; pale yellow, large, round, hairy.
Garibaldi; pale yellow, large, long, hairy.
Gipsy Queen; pale yellow, large, smooth, early.
High Sheriff; deep yellow, large, round, very hairy.
Lord Rencilffe; pale yellow, medium, round, hairy.
Moreton Hero; pale yellow, large, oval, smooth, skin thin.
Mount Pleasant; deep yellow, long, hairy, late.
Rumbullion; pale yellow, small, very downy, early.
Sing Beauty; yellowish white, large, oblong, quite smooth, early.
Sulphur; yellow, small, roundish, hairy, and of good flavour.
Yellow Ball; yellow, medium, thick-skinned, smooth.
Yellow Champagne; small, of rich flavour, hairy, late.

3. Gooseberries with Green Skin.

- Green Gascoigne**; deep green, small, round, early.
Green London; bright green, medium, smooth.
Green Overall; dark green, of good flavour, medium size, smooth.
Green River; deep green, smooth, medium, oval.
Green Walnut; dark green, smooth, medium, obovate, skin thin.
Gregory's Perfection; green, downy, large, round.
Heart of Oak; smooth, large, oblong, skin green with yellowish veins.
Hebburn Prolific; medium, roundish, hairy, early and abundant.
Jolly Anglers; large, oblong, of good quality, downy, late.
Keepsake; green, large, smooth, sometimes a little hairy, ripens early.
Laurel; pale green, downy, large, obovate, late.
Lord Eldon; dark green, smooth, round, very rich flavour, early.
Random Green; deep green, smooth, large, of good flavour, good bearer.
Roseberry; large, round, dark green, smooth.
Shiner; very large, round, smooth, one of the largest gooseberries grown.
Stockwell; bright green, long, smooth.
Telegraph; large, long, smooth, late.
Thunder; large, roundish, hairy, of excellent flavour, early.

4. Gooseberries with White Skin.

- Abraham Newland**; white, large, oblong, slightly hairy, rich flavoured, late.
Adam's Snowball; medium, roundish, skin hairy.
Bright Venus; medium, obovate, slightly hairy, hang well.
Careless; creamy white, large and long, smooth, very handsome.

- Cheshire Lass**; large, oblong, downy, of rich, sweet flavour.
Crystal; small, roundish, smooth, late variety.
Early White; roundish-oblong, downy, of rich flavour, skin thin, very early.
Hero of the Nile; greenish-white, large, smooth.
King of Trumps; roundish-oblong, slightly hairy, of good flavour.
Mayor of Oldham; greenish-white, round, smooth, of excellent flavour.
Princess Royal; large, obovate, hairy, of good flavour, good bearer.
Queen of Trumps; long, flat-sided, smooth, large, and of excellent flavour.
Royal White; small, round, slightly hairy.
White Champagne; small, roundish, sweet and rich, hairy.
White Fig; small, obovate, smooth, will hang till it shrivels.
White Lion; large, obovate, slightly hairy, rich flavour, very late.
Woodward's Whitesmith, also known as Hall's Seedling, Lancashire Lass, and Sir Sydney Smith; white, downy, large, roundish oblong, of excellent flavour, rather early, abundant bearer.

It will be noticed that the last-named variety is distinguished by having four names as synonyms. Not many are thus distinguished, but it may be as well to point out that Ironmonger (red) is sometimes called Hairy Black, that Red Champagne is also known as Countess of Errol and Ironmonger of Scotland, and Red Warrington as Aston Seedling and Volunteer. Among the yellows, Sulphur is also known as Rough Yellow, and Yellow Champagne as Hairy Amber. Among the greens, Laurel is sometimes called Green Laurel.

From such a list as the above, the most fastidious grower cannot fail to pick out a variety of sorts well suited to his requirements, but it may be that some in attempting to make a selection will be puzzled which to choose from the sorts named. For such as these the following will afford a sufficient list for all necessary purposes:—

- | | |
|-----------------------|------------------------|
| 1. Large White Smith. | 6. Crown Bob. |
| 2. Early Sulphur. | 7. Lancashire Lad. |
| 3. Yellow Rough. | 8. Whinham's Industry. |
| 4. Warrington. | |
| 5. Rishman. | |

The magnificent gooseberry of recent introduction, named "Whinham's Industry."

dustry," is of the highest possible worth, owing to the valuable properties it possesses of flowering late, and afterwards swelling so quickly as to reach a suitable size for pulling green sooner than any other variety. When left to attain maturity the fruit is of a dark red colour and hairy, and is distinguished by a pleasant rich flavour.

GRAVES.

For the management of vines and the care of grapes in all stages, from the appearance of the blossom to maturity. See the various monthly calendars. Also see *Vines*. The following grape vines are recommended by Mr. George Bunyard, The Old Nurseries, Maidstone. Those marked (1) are suitable for out-door culture; and those that are marked (2) may be managed in a cool greenhouse; those left unnumbered require a properly constructed and heated viney.

Alicante Black.—One of the largest and best grapes for late work, carrying a fine bloom.

Ainwick Seedling.—A grand black grape for late work; requires setting with the pollen of Hamburg.

Black Cluster (1).—A very free bearer; sweet, ripens out of doors.

Bowood Muscat.—A very large berried golden variety of great excellence; can only be managed in a well-heated viney.

Cambridge Botanic Garden (1).—A hardy purple grape; an abundant bearer, suitable for out-door culture.

Chasselas Vibert (1).—A very refreshing white grape of the Sweet Water class; suitable for out-door culture.

Diamant Traube.—A fine oval Sweet Water grape, but little known; it is of first-class quality.

Duke of Buccleugh.—The largest white grape, tender, with sprightly Hamburg flavour;

(1).—A hardy sweet grape for out-side culture.

Foster's Seedling (2).—A large bunched variety of Sweet Water grape; one of the finest white grape, richly flavoured; good for early forcing.

Gros Colman.—Black, fine for exhibition, giving very large bunches and berries, a good very late kind; unless grown in heat and well finished the flavour is inferior.

Gros Maroc (2).—Remarkably fine black late grape, carrying a dense bloom; the berries very large and the flavour excellent; a very fine addition to our keeping kinds.

Hamburg Black, or Frankenthal (2).—Juicy, sweet and rich, a well known and excellent sort; sometimes ripens out of doors; best for general use, pot culture, and forcing.

Lady Downe's Seedling (2).—Bunch large; berries black and round, thick skin, sweet flavour, first quality, one of the best keeping grapes.

Mill Hill Hamburg (2).—A fine variety of the popular black grape, succeeding the old kind; first rate quality.

Miller's Burgundy (1).—A hardy purple grape for out-door culture.

Muscadine, White, or Royal (1, 2).—A good grape for out of doors or greenhouse.

Muscat of Alexandria.—Rich amber, bunch immensely large, with a deliciously rich Muscat flavour; requires a warm viney.

Muscat Hamburg.—One of the finest for flavour, not always a good setter, but well done is delicious.

Madresfield Count Black Muscat.—Berries oval, very large and handsome, with a high Muscat flavour, a free setter, most valuable grape, and good for pot forcing.

Mrs. Pince's Black Muscat.—One of the finest flavoured grapes, requires good culture.

Primavis Frontignau.—A highly flavoured

sweet water, Buckland (2).—Large bunch, berries large, of a yellowish-green colour, melting and tender flavour equal to the Royal Muscadine; a splendid grape.

Sweet Water, Old White (1, 2).—A sweet, thin skinned, well-known grape, succeeds in the open air.

White Frontignau (2).—A very fine grape with Muscat flavour; hardy, and a good bearer.

MEDLARS, M

There is nothing of any especial importance to be said about the culture of these fruits, the mode of planting being similar to that adopted for any standard tree wherever there is room for them: one or two trees of each kind should be planted; the first and last may be placed in the garden or orchard, the second should have grass under it to save the fruit from injury when it falls. In buying these trees, or indeed, fruit-trees of any kind, it is desirable to state nature of soil and the position they are to occupy to the nurseryman, and then leave it to him to make the selection. Of medlars there are three varieties, the Dutch, the Nottingham, and the Stoneless. Mulberries are of two kinds only, the Black and the White. Quinces are distinguished as Common, Portugal, Apple-shaped, and

Pear-shaped. There is also a variety known as the Chinese quince.

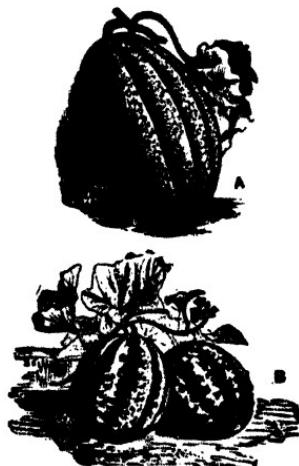
MELONS, CULTURE OF.

The culture of the melon is very similar to that of the cucumber. The preparation of the manure, making the bed, raising the plants, the stopping and setting, are the same ; but the soil in which they are finally planted should be trodden down rather firmly ; and as the fruit appears all nearly about the same time, it is advisable to have them swell off as nearly as possible to-

setting to the time of ripening, which is indicated by the stalk appearing to separate from the fruit. They should be cut and used on the day this takes place, or very soon after.

Second Crop, Production of.—As soon as the fruit is cut (if it is intended that they should bear a second crop), prune back the shoots to where the fresh growth commences. Two or three inches of fresh loam should be spread over the surface of the bed, which should at the same time have a good soaking with manure water, to assist the plants to make a fresh growth ; an additional stimulus at the same time should be given to the roots by slightly increasing the bottom heat. Bring forward the succeeding crops, and take every means to keep down the red spider, which, when once established on the foliage, is most difficult to destroy.

Moisture, Regulation of.—Melons, while ripening their fruit, are very liable to crack when exposed to moisture, or when water is supplied too freely to their roots. This is more likely to happen with the higher flavoured ones, from the thinness of their skin. In common frames some difficulty will be found in keeping the air sufficiently dry. To prevent this in moist weather, air must be left on at night both back and front, to admit of a slight circulation ; and a little extra heat should be thrown into the bed, to keep up the temperature, by turning over linings. Where, however,



TYPES OF MELONS.—(A) GREEN-FLISHED, NETTED;
(B) CANTALOUP.

gether ; otherwise, the most forward will take the lead, and become much larger than the other. Two melons on a plant are as much as can be expected to do well ; but never more than three should be allowed to remain : pinch off all the rest, and every other unnecessary growth. It is important that the plants be not allowed to ramble after the fruit has begun to swell, for this will require the whole strength of the plant. The fruit takes some four or five weeks, occasionally more, from the time of

the plants are grown in will have

effect on the quantity of water they will require. In lofty pits or houses, where the foliage attains a large size, and where a much drier atmosphere is obtained than in frames and low pits, more water will be necessary, and the surface of the soil should be frequently sprinkled.

MULBERRY. See Medlars.

NECTARINES.

Full directions for the treatment of nectarine trees will be found under the head of *Fruit Garden* in the calendar for each month. It is only necessary to say here that the following are recommended as excellent varieties of this delicious fruit :—

- | | |
|-----------------------|----------------------|
| 1. Downton. | 7. Rivers' White. |
| 2. Elrige. | 8. Violette Hative. |
| 3. Hardwicke. | 9. Spencer. |
| 4. Hunt's Tawny. | 10. Prince of Wales. |
| 5. Lord Napier. | 11. Pine Apple. |
| 6. Pittmaston Orange. | 12. Victoria. |

ORANGE AND LEMON.

As far as the cultivation of orange and lemon-trees goes, all that need be said about it is that those who are desirous of possessing specimens should sow the pips in pots filled with light rich soil, and subjected to brick-bottom heat. The pots should further be kept under glass, and where the seeds have sprung up the plants should be kept in an atmosphere both close and warm. When about from 12 to 18 inches in height, the seedlings must be grafted or budded with grafts or buds from an established flowering and fruiting

drained by tiles inserted six inches beneath the chalk-level, the tiles being covered over to that depth with broken stones. The permanent trees, which, if it is intended to lay the orchard down in grass, must be standards and half-standards, with from 4 to 6 feet of clear stem, should be planted in rows, from 30 to 40 feet apart, and in what is termed the *quincunx* style, thus :—

The north or coldest side of the orchard should be planted with walnuts, cherries, medlars, chestnuts, &c., to provide shelter for the others. These might be succeeded by the hardiest plums and apples, to be followed by the tender pears on the south or warmest side. If a gradation of height were also followed, the shelter provided would be more efficient, and the general effect more pleasing. Filberts, mulberries, and service-trees may also be introduced. But these temporary trees should be inserted as nurses between the trees. Firm-growing varieties that come early into bearing should be chosen for the purpose, and they will not only encourage the growth of the permanent trees, but pay their own cost a dozen times over before they require removal. They must, however, be carefully watched, lest they weaken the energy or destroy the symmetry of the permanent trees. The rows should run east and west.

Though, from the introduction of dwarf trees, upon which, in a good kitchen garden, as much fruit may be grown as will be required for the consumption of an ordinary family, an orchard is not so necessary now; as it was some years ago, still this useful appendage of the country house should not be wholly neglected. A piece of pasture where the soil is good

ORCHARDS.

The spot selected for an orchard should be entirely sheltered from the north and north-east, and should have a gentle inclination, and full exposure to the south. The best soil is a good loam, four feet in depth, resting upon chalk, thoroughly

may be very profitably employed as an orchard. It will yield both a crop of fruit and a crop of grass, and if the former be not required for consumption, there is at all times a ready sale for it. Apples, peas, and cherries are the fruits properly cultivated in orchards ; but plums, walnuts, and filberts are not unfrequently considered as orchard fruit, and in cases where there is only one orchard, all these fruits may, with advantage, be included in it.

Upon the nature of the site and soil best suited for an orchard, Abercrombie observes, "Land sloping to the east or south is better than a level ; a sheltered hollow, not liable to floods, is better than an upland with the same aspect, and yet a gentle rising, backed by sufficient shelter, or the base of a hill, is eligible. A good loam, in which the constituents of a good soil predominate over those of a hot one, suits most fruit-trees ; the subsoil should be dry, and the depth of mould thirty inches or three feet. Before planting, drain, if necessary ; trench to the depth of two feet, manure according to the defects of the soil, and give a winter and summer fallow ; or cultivate the site for a year or two as a kitchen garden, so that it may be deeply dug and receive a good annual dressing."

Informing an orchard, Dr. Lindley recommends the early transplanting of the different trees. "They cannot," he says, "be removed from the nursery too soon after the wood has become ripe and the leaves have fallen off, for between this time and the winter many of them will make fresh roots, and be prepared to push forth their young shoots with more vigour in the spring than those whose transplanting has been deferred to a late period of the

All young trees should be carefully staked and protected from the wind, and, if a dry spring should succeed the autumn of their planting, they will require to be watered, or, what is better, to have

manure laid round their roots and to be watered through it. Pruning and training are necessary ; but, as a general rule, the knife should be avoided, if it is possible to bring the tree into good shape without it. Pear-trees will thrive in a lighter soil than apples, and they are generally more hardy, and bear the wind better. In a good soil, the distance at which trees should stand from each other is from twenty-five to thirty feet ; if all free-growing varieties are planted, it may perhaps be desirable to give from thirty to forty feet between them, and in all cases the quincunx mode, as already stated, is the best.

In selecting apples and pears for planting, and, indeed, all fruits that admit of sorts, it is of the greatest importance to take into consideration not only soil but climate. Very little good is gained by selecting the best varieties if they, or any of them, are not suited to the locality. Disappointment too often follows want of judgment in this respect. Whoever intends to plant an orchard, especially of apples and pears, should ascertain, in the first instance, what sorts flourish best in his part of the country. He should then select the best of these, and introduce such other sorts as, from their resemblance to them, may seem likely to answer. The following lists are taken from the catalogue of Messrs. George Bunyard & Co, Pomologists, Maidstone.

The sorts are undoubtedly all good, and the descriptions accurate ; but intending buyers are advised to tell the grower what kind of soil the trees are to be planted in, and leave it to him to make a selection of fitting sorts, as it must not be assumed that every kind of apple is equally well adapted to every locality.

Twenty-four Orchard Apples.

A. kitchen purposes ; T. table.

1. Alfriston, A.—large, round, skin light orange next the sun, greenish-yellow in the shade ; flesh

- yellowish, crisp, sharply acid. November to March. A fruitful variety and showy grower.
- Bedfordshire Foundling**, *K.*, *T.*,—very large, pale green when ripe; flesh yellowish, acid. November to December. A handsome apple, of *Blenheim Orange* style and flavour.
3. **Bismarck**, *K.*,—large, possesses the weight and texture of a *Wellington*, with a bronzy red cheek. A valuable and distinct variety, proving to be a remarkably free bearer, and a hardy, vigorous grower. October to January.
 4. **Blenheim Orange**, *K.*, *T.*,—very large, ovate, yellowish, red next the sun; flesh yellow, sugary. November to June.
 5. **Bramley's Seedling**, *K.*, *T.*,—large fine orchard fruit, making a vigorous tree. A valuable, heavy, late keeper; free and constant bearer, flat, with dull red cheek, first-rate, brisk acid flavour. December to April.
 6. **Cox's Orange Pippin**, *T.*,—medium, of *Ribston* flavour, great bearer, the finest dessert apple, good habit, excellent as garden tree, prefers a warm, rich soil. November to January.
 7. **Devonshire Quarrenden**, *T.*,—this is the famous "sack apple" of the western counties. Medium size, deep crimson; flesh greenish-white, often streaked or flushed with crimson, juicy, subacid. August.
 8. **Durnelow's Seedling**, *K.*,—large, round, yellow and light red; flesh yellow, first-rate. November to March. Also known as *Wellington* and *Normanton Wonder*.
 9. **Ecklinville Seedling**, *K.*,—large and a free bearer; one of the best *Codlins* for garden culture, succeeding in all forms. September to October.
 10. **Fearn's Pippin**, *T.*,—full medium size, round, and handsome, greenish yellow, russety, and bright red; flesh greenish-white, sweet, and rich-flavoured. February to March.
 11. **Gascoyne's Scarlet Seedling**, *K.*, *T.*,—large; a distinct red-cheeked apple, extremely handsome, a great bearer, and a healthy, free grower. Fruit of agreeable flavour. November to February. Called also *Glory of England*.
 12. **Grenadier**, *K.*,—very large, handsome yellow fruit, a regular cropper, and by far the finest *Codlin* out. Good in any form for garden or orchard. September to October.
 13. **Hawthornden, New**, *K.*,—large, ovate, yellowish-green, reddish blush next the sun; flesh white, juicy, almost good enough for dessert. This never fails to give a large crop; it is not a strong grower. November to December.
 14. **Kerry Pippin**, *T.*,—small, pale yellow, streaked with red; flesh yellow, firm, juicy, and sweet. First-rate in every respect. September to November.
 15. **Lady Henniker**, *K.*, *T.*,—large, good and robust grower and bearer, very fine flavour, keeps well, hardy and suitable for exposed places. December to February.
 16. **Lady Sudeley**, *T.*,—large dessert. Fruit of wonderful rich spicy flavour and aroma, beautifully striped with crimson when ripe. August to September. Called also *Jacob's Strawberry*.
 17. **Lord Grosvenor**, *K.*,—very large free-bearing *Codlin*, finest early apple, robust grower with splendid foliage. One of the best early kinds grown. August to September.
 18. **Melon**, *K.*,—large, lemon-yellow and light crimson; flesh white, tender, juicy, vinous, perfume. One of the best American apples, generally fruitful. December to March.
 19. **Nonpareil, Old**, *T.*,—small, greenish-yellow, one of the hardest; pale russet and brownish-red; flesh tender, juicy, rich. January to March.
 20. **Northern Greening**, *K.*,—medium, dull-green, brownish-red; flesh greenish, subacid. First-rate. November to March.
 21. **Red Juneteenth**, *T.*,—medium, one of the best early apples for table; rich aroma, forms fertile garden tree. August.
 22. **Ribston Pippin**, *T.*,—medium, one of the most delicious apples grown as regards flavour. Not suitable for orchards, but requires a warm soil and aspect in a garden. November to January.
 23. **Sturmer Pippin**, *K.*, *T.*,—medium, yellowish-green and brownish-red; flesh yellow, firm, sugary, and rich. February to June.
 24. **Worcester Pearmain**, *T.*,—large, handsome greenish-yellow and deep red; flesh juicy, sweet, and brisk-flavoured. September.
- For very exposed situations on the east coast and north of the island the following varieties are recommended :
- Kitchen**.—Grenadier, Hawthornden, Keswick Codlin, Manx Codlin, High Canons, Tower of Glamis, Wellington.
- Table**.—Devonshire Quarrenden, Early Julian or Fair Lady, Kerry Pippin, Peasgood's Non-such, Lady Henniker, Winter Queening.
- From the same excellent authority the following list and description of pears suitable for orchard cultivation.
1. **Alexandre Lambre**,—medium size, melting, rich, and exquisite; prolific bush. November.
 2. **Bergamotte d'Eperen**,—medium, late, melting. Forms a handsome prolific pyramid or bush; but in wet or cold climates it requires a wall. January to April.
 3. **Beurré Brown**,—large and excellent. October.
 4. **Beurré Clairgeau**,—very large and handsome, not of first-rate quality, but passable when gathered before it is quite ripe. A remarkably fertile fruit. October to November.
 5. **Beurré d'Arenberg**,—medium, delicious, melting; forms a handsome prolific pyramid; a warm situation.
 6. **Beurré d'Amanlis**,—very large, melting; one of the best autumn pears, not particular as to soil. September.
 7. **Beurré Rance**,—large, late, melting, insipid from a wall; but on the quince, in the open grounds, its flavour is quite exquisite. Requires double working, and forms a better bush than a pyramid. December to March.
 8. **Beurré Easter**,—Large, melting, perfumed, insipid from a wall; best on the quince, and forms a beautiful bush. January to March.
 9. **Bon Chrétien (Williams's)**,—large, perfumed, melting; should be gathered before it is ripe.

10. **Chaumontel**,—large, well known, melting. November. This is the pear which grows so fine in Jersey and Guernsey.
11. **Colman d'Eté**,—small, prodigious cropper, makes a good standard, fruit juicy and of honied sweetness. September.
12. **Comte de Larny**,—medium; one of our most delicious autumn pears. October to November.
13. **Doyenne d'Eté**,—very small, the earliest pear to ripen, refreshing and very pretty, bears freely in any form, best gathered a few days before it is ripe. July.
14. **Doyenne du Comice**,—large, splendid, very handsome, of finest possible flavour; ranks as the most delicious pear grown. November to December.
15. **Duchesse d'Angoulême**,—very large and handsome, insipid from a wall; forms a fine pyramid. October or November.
16. **Jargonelle**,—large, the best fruit of its season; is improved in flavour if gathered before it readily parts from the tree. Good on walls or as an open standard. August.
17. **Josephine de Malines**,—medium size, delicious melting pear, aromatic. On the hawthorn it forms a spreading, fruitful tree; succeeds well not form a handsome bush or espalier it is very prolific. February to April.
18. **Louise Bonne of Jersey**,—large. When cultivated on the quince stock, this is the most beautiful, as well as the most delicious, melting pear of the season. October.
19. **Marie Louise**,—large, melting, excellent; on the pear it forms a prolific pyramid, on the quince, double-worked, a prolific bush. October, November.
20. **Monarch (Knight's)**,—medium, excellent; forms a handsome pyramid on the pear. Deserves a wall, and may always be relied on. November to March.
21. **Pitmaston Duchess**,—very large, a grand golden yellow melting pear; succeeds admirably as standard in pear soil. October, November.
22. **Seckle**,—small, highly-flavoured, melting; bears profusely as the pyramid on the pear. October.
23. **Triomphe de Vianne**,—very large, russety, of rich flavour, a fine grower and free bearer, being a desirable variety of great excellence. September.
24. **Winter Nellis**,—small, roundish, buttery, and melting, rich and aromatic; an abundant bearer, and a beautiful bush. November to January.

The following pears are also suited to orchards and well worth growing: Aspasiee Ancourt, Bellessime d'Hiver, Beurre de Capiaumont, Bishop's Thumb, Grosse Calebasse, Hacon's Incomparable, Marie Louise d' Uccle, Prince Napoleon, Passe Crasanne, Swan's Egg.

There are several sorts of baking and stewing pears, but the best are, Catillac, Vicar of Winkfield, Vernalum, or Black Jack,

Gilogil, General Todleben, Orchard Baker, and Uvedale's St. Germain, for a wall.

The following pears are best adapted for a cold climate: Alexandre Lambré, Gansel's late Bergamot, Beurré d'Amanlis, Williams's Bon Chrétien, Calebasse d'Eté, Colmar d'Eté, Citron des Carmes, Hesse, Jargonelle, Louise Bonne of Jersey, and Thompson's Pear.

As cherries and plums have been spoken of as orchard fruit, it may be well to give a small list of each for the guidance of those who are intending to plant an orchard. The earliest cherries are the Early Lyons, the Purple Guigne, and the Baumann's May. These are succeeded by the Early Rivers, the Elton, the May Duke, and Governor Wood. Next in order come the Kentish Bigarreau, Royal Duke, and Black Eagle; the Late Duke is the latest of sweet cherries, and with this may be named the Black Tartarian and Napoleon Bigarreau. For cooking purposes there is the Kentish; and for brandy, the Morella; for drying, the Belle de Choisy, the Flemish, and the Kentish. Waterloo is a good cherry, ripening in July, so are Werder's Black Heart, Adams' Bedford Prolific, and Black Turkey Heart.

Of plums the varieties are infinite. Among the best may be classed, Archduke, Cox's Emperor, Coe's Golden Drop, Denniston's Superb, Denyer's Victoria, River's Early Prolific and Grand Duke, Old Greengage, Guthrie's Late Green, Jefferson's Yellow, Kirke's Blue, Magnum Bonum, Mitchelson's Large Black, New Orleans or Wilmot's Early, Oullin's Golden-gage, Reine Claude de Bavy, Rivers's Late, the Sultan, the Czar, Washington and Wye-dale.

For the best varieties of filberts see under that head. Grow only the best varieties, and in preference grow Kentish Cobs, which are, perhaps, more remunerative than any other.

PEACHES.

In the calendar of the different months will be found full instructions for the growing and management of peach-trees, whether out-of-door or under glass. The following are the best varieties:—

(1) <i>Early.</i>	(2) <i>Medium.</i>
1. Acton Scot.	1. Barrington.
2. Early Alfred.	2. Bellegarde.
3. Early Beatrice.	3. Princess of Wales.
4. Dagmar.	4. Violette Hâtive.
5. Rivers' Early York.	(3) <i>Late.</i>
6. Grosse Mignonette.	1. Late Admirable.
7. Hale's Early	2. Walbrunn Admirable.
8. Noblesse.	3. Sea Eagle.
9. Royal George.	4. Golden Eagle.

PEARS.

These are best grown dwarf. The varieties of the pear are very numerous.

The following are twelve good varieties of market pears, arranged in order of ripening. Those marked with a star may be planted in cold soils:

1. Doyenne d'Eté.*	7. Beurre de Capiau.
2. Lammass.*	mont.
3. Jargonelle.*	8. Althorp Crassane.
4. Williams' Bon	9. Fertility.
Chrétien.*	10. Eyewood.
5. Colmar d'Eté.*	11. Bishop's Thumb.
6. Hessell.*	12. Broom Park.

The following are choice pears, good as standards, or for training on walls:

1. Souvenir de Con-	10. Duchesse d'An-
grés.	goulême.
2. Beurre d'Amanlis.	11. Josephine de Ma-
3. Doyen Bousooch.	lines.
4. Durondeau.	12. Doyenne du Co-
5. Pittmaston Duchess	mice.
6. Beurre Superfin.	13. Beurre Dell.
7. Beurre Hardy.	14. Marie Louise.
8. Beurre Clairgean.	15. Triomphe de Vi-
9. Louise Bonne of	enne.
Jersey.	

PINEAPPLE.

At one time pineapples, or pines as they are usually called for the sake of brevity, were the great luxury of the upper ten thousand; now, through the numerous quantities imported, they are brought within the reach of all: perhaps chiefly for this reason they are not so generally grown as formerly. There is also a very

prevalent idea that their cultivation is both difficult and expensive. The formidable treatises published on their culture have frightened many from undertaking it; and yet few plants are more easily cultivated. There is also no comparison between a well-ripened English-grown pine and an imported one. The former is generally a luscious fruit; the latter is very often but little better than a sweet turnip. Occasionally, however, good foreign pines may be had; but they can never compete with English ones; and there is no reason, in cultural difficulties nor expense of production, why every lover of this fruit should not grow his own.

Houses and Heating.—Houses for their culture are easily made. No peculiarity of structure is necessary. Doubtless the nearer the light they can be placed the better, although excellent pines may be grown under the shade of vines at least a yard from the roof. The most convenient, and ultimately the cheapest mode of supplying bottom-heat, is by hot water; pipes, and a hot-air chamber under the bed, are best, and least liable to accident.

Beds.—The bed to grow pines in should be 4 feet deep, to allow of a sufficiency of plunging material to cover the highest pots, and of sufficient soil to plant the pines out in the bed. This latter is the best, cheapest, and most efficient mode of growing pines. Prepare the bed thus:—Place 6 inches of rough brickbats for drainage, then a layer of broken bones two inches thick; on this a layer of rich loam, in whole pieces, with the turf inverted on the drainage in solid pieces one foot square and 2 to 3 inches thick. Then fill up to within 8 inches of the top, with this soil chopped into pieces about four inches square, mixed with broken bones and pieces of charcoal, and broken freestone instead of sharp sand. The charcoal or bones give a sort of enriching power to

the loam, and all other food is supplied afterwards, just and only when it is wanted, in a liquid state.

Sorts for Cultivation — Secure some good Queens of any approved variety, and some black Jamaicas for winter; as many Providences as room can be found for, with a few Montserrats, and these are all that are required. For the general crop nothing equals the Queens. Providences are the next best, and by far the noblest of all. See that the plants are perfectly clean and

smooth surface, water with water at a temperature of 80° , and the work is complete. Plants thus bedded out will not require watering nearly so often as those in pots; and if the entire surface be mulched over with cocoanut-fibre refuse, a good soaking once a month, in the growing season, will probably suffice. It is probable that, with generous treatment, most of these plants will fruit within eighteen months of the time of planting.

Suckers.—When the fruit is cut, let the leaves be as little injured as possible. With amazing strength and rapidity, two or three suckers will spring up, and grow with the greatest vigour. One only should be left, the others may be either potted for succession plants or be thrown away. From a period varying from six to twelve months from the time of cutting one fruit, another will be ripe on the same stool.

After-Treatment.—As the young plant on the stock advances, the old leaves on the latter may be reduced until all, or nearly all, are removed. At the same time the roots should receive a rich

top-dressing of the same material in which they grow; thus nearly eight inches will be left on the surface at planting, so as to allow two or three inches of fresh dressing to every new crop. This is essential, as, from the suckers possessing a self-elevating power and proceeding from a few inches of the bottom of the stool, they could not have an independent support from the soil unless it was raised up with them. After a few years it may be necessary to remove the entire bed *badly*, and begin at a lower level afresh. There can

healthy, rather than large, when they are purchased. When pines once get infested with white scale or mealy bug, they are useless.

.—Turn the plants carefully out of the pots, plant from 3 to 5 feet apart, according to the sorts, size of plants,

Providences require most space. Unwind as many roots as possible without breaking the ball too much; earth up the stem as high as the good, sound, healthy leaves (those that are otherwise should be

i) will allow you; leave a hard,



TYPE OF PINEAPPLE.

be no question that this is the cheapest, most rapid, and most profitable system of management.

Making New Beds, &c. When the suckers are thoroughly rooted (which is often the case before the fruit is cut), and the fruit is cut, remove the stools, separate the suckers, make a new bed, and plant the latter singly, as at the beginning. Whatever plan be adopted, it will often be necessary to pot quantities of the best suckers to keep up a good stock, form new beds, &c. When the beds get too thick, or the soil gets exhausted, begin as at the beginning.

PINEAPPLES IN POTS.

Potting Season.—In growing pines in pots there will generally be two potting seasons—March, and June or July. Ten- or 12-inch pots will fruit the largest plants, and as soon as the first are cut, and the suckers large enough for removal, the stools may be destroyed. Pots of the largest size are recommended for pines, supposing the plants are well grown and in vigorous health; but nothing but disappointment will follow placing pines in large pots when the pots in which they are growing are not filled with roots to justify shifting them. Much, however, the easiest and cheapest way to grow pines is to have them planted on a bed of soil furnished with bottom heat, either by hot-water pipes, or by applying hot dung underneath; the soil being supported by brickwork and slates, or rough boards. The bottom heat required will be from 85° to 95°, and the soil may be turfy loam and peat, with sand and leaf mould, varying the latter as the loam is heavy or light. If the plants are growing in pots, they may be turned out into the beds whenever the bottom heat is right; a few of the outside shoots being liberated, and the soil carefully packed round the balls as you proceed. The bed should be

brought pretty close up to the glass; for as the plants will grow vigorously during the autumn, they will require an abundance of light, assisted by a liberal supply of air, to check vegetation and mature the fruit. In planting out or growing in pots, always allow plenty of room between the plants, that the leaves may spread themselves in a horizontal direction, and thus expose their surface better to the light; and it should likewise be a point that the light and air should reach the lower leaves, which can never be the case when they are crowded together. Directly the succession plants are removed to the fruiting-house, the younger plants intended to succeed later next season, and suckers, should be re-shifted and plunged to occupy their places. After the suckers, &c., are potted and plunged, keep them rather close for a few days till they begin to grow, after which expose them to light and air.

Importance of Leaves.—In all work among pines, remember their leaves are their very life. Appearance also requires that they should never be bruised or injured in the least. Practice alone can enable one to perform the necessary operations without bruising or breaking the foliage. The roots, too, must be carefully preserved. The facility with which pines emit roots up the stems made the old gardeners reckless about those they already possessed: hence the wholesale disrooting once so common. But the emission of fresh roots does not necessarily supersede the use of those already formed. Neither do pine-roots die naturally annually; the longer they can be preserved the better. The more mouths, provided there is food to fill them all, the more nourishment and strength will be imparted. It is the business of the cultivator to supply this food in a liquid state when and where it is wanted. Healthy roots and leaves convert it into pine fruit; consequently, the greater the

quantity used, the heavier and the better-flavoured the pine will be.

PLUMS.

The following are 28 excellent varieties of plums, mostly taken from Bunyard's "Fruit Farming for Profit." Damson plums are marked (D) :—

- | | |
|----------------------------|---------------------------------|
| 1. Victoria. | 16. Belle de Septembre. |
| 2. Early Orleans. | 17. Gisborns. |
| 3. The Czar. | 18. Prince of Wales. |
| 4. Mitchelson. | 19. Grand Duke. |
| 5. Kent Diamond. | 20. Blue Prolific (D). |
| 6. Prince Engelbert. | 21. Goliath. |
| 7. Belgian Purple. | 22. La Delicieuse. |
| 8. Cox's Emperor. | 23. Old Orleans. |
| 9. Rivers' Early Prolific. | 24. Deniston's Superb. |
| 10. Pershore. | 25. Kentish Cluster (D). |
| 11. White Magnum Bonum. | 26. Cheshire or Shropshire (D). |
| 12. Pond's Seedling. | 27. Prune (D). |
| 13. Old Greengage. | 28. Frogmore Damson (D). |
| 14. Sultan. (pote.) | |
| 15. Autumn Com- | |

QUINCE.

The three existing varieties of quince are known as "Apple Shaped," "Pear Shaped," and "Portugal." Propagation may be effected by seeds, cuttings, or layers. The fruit is used for making marmalade, and one or two added to an apple pie imparts a desirable flavour to the fruit used.

RASPBERRY, CULTURE OF THE.

Raspberries flourish in any good rich loam, and grow to perfection in a dark, unctuous soil. As a rule, raspberries do well where black currants flourish, and neither of these are very productive where cherry-trees thrive best. Before planting, the ground should be well trenched and manured; for though the roots lie near the surface, it is well to induce them to strike downwards in the event of a dry season. The second or third week in October is the best period for planting. Strong canes should be selected, and great advantage is gained if

they be taken up with soil upon their roots. They may be put in singly, in rows, or in bunches of three canes each. In this latter case, it is desirable to cut the canes of different heights; the strongest may be four feet, the second three feet, and the third two feet. Staking will be necessary before the plants begin to grow in the spring, and great care should be taken that the ground is not trodden in wet weather. In staking, it is desirable to plant the stools in rows, from four to six feet apart. Drive in uprights along the rows at intervals of six feet, and to the uprights, which should be from five to six feet in height, tie or screw horizontal slips of wood about one-and-a-half or two inches broad, and three-quarters of an inch thick. Spread the canes along these strips fan fashion, and tie in position with bast raffia or tarred cord.

Pruning.—The pruning of raspberries is an easy matter. In June the bushes should be gone over, and all suckers removed, except about six of the strongest. These, at a later period, may be reduced to four, and if the parent plant be weak, two or three will be sufficient. There is great benefit in cutting the canes of different heights, for as the top buds grow strongest, the young fruit-bearing shoots are more equally divided, and enjoy more air and light. The ground in which raspberries are grown should not be broken up, but have a top dressing of good rotten manure yearly. By a little management, raspberries may be made to bear a crop of fruit during autumn. For late bearing, as soon as root suckers show themselves in June, the old canes should be cut away entirely, so as to prevent summer fruiting; and encouragement given during July and August to such suckers as show blossom-buds, for these will bear fruit in autumn. Autumn-bearing raspberries must be kept thin, or they will not prove successful.

The canes for this purpose should be planted in single rows, and not in threes, as recommended for summer fruiting. They should stand about one foot apart.

Raspberry, Varieties of.—The most useful varieties of the raspberry are the Red Antwerp, Fastolf, Prince of Wales, and the Yellow Antwerp. The Antwerp Red is a finely flavoured and highly productive variety, and is still regarded as one of the best; and Antwerp Yellow or White—call it which you will—is of delicious flavour, and a most useful fruit for dessert. Of more recent varieties, Baumforth's Seedling is highly productive, and yields a fine fruit of excellent flavour; and Carter's Prolific is a large and great bearer, and highly fruitful. Lord Beaconsfield is a particularly fine sort, and from its robust habit stands continued dry weather better than any other; it requires, however, high cultivation. The fruit is immense, and appears on the canes in the greatest profusion from the bottom to the top of the cane, which sometimes reaches the height of twelve feet. It is said that as many as two thousand berries have been gathered from a single stool. Semper Fidelis is a free grower, but is more useful for preserving than dessert, as it has a more acid flavour than most other varieties. It is, however, a great and continuous cropper, and continues to yield fruit when none can be gathered from any other sort. Superlative is considered by growers to be the best sort and heaviest cropper of any, and is a perfectly distinct variety. It is essentially a dessert raspberry, having a large and very handsome berry, attached by a long foot-stalk. It is incapable of injury from drought, and the canes are so stout that they need no artificial support. The fruit is large, conical, and entirely free from watery juice, and it is said that six good-sized fruit will together weigh an ounce. White Magnum Bonum

is a very fine white fruit, of sweet and palatable flavour, and large in size. Of autumnal kinds—which should be cut down in February, and the summer growth well thinned out—Belle de Fontenay is recommended as a good red double-bearing kind, occasionally yielding a good supply in September and onwards; and Yellow Four Seasons is also a good bearer, yielding a nice sweet fruit. The "Glenfield" is a black raspberry and the only kind of its peculiar colour.

As a summing up of what has been said above, the following will show at a glance the best kinds of raspberries now in cultivation:—

- | | |
|------------------------|----------------------|
| 1. Baumforth's Seed- | Prince of Wales. |
| ling. | Red Antwerp. |
| 2. Belle de Fontenay. | Semper Fidelis. |
| 3. Carter's Prolific. | Superlative. |
| 4. Fastolf. | White or Yellow |
| 5. Glenfield (the only | Antwerp. |
| Black Raspberry). | 14. White Magnum |
| 6. Lord Beaconsfield. | Bonum. |
| 7. Marlborough. | 15. Yellow Four Sea- |
| 8. Northumberland | sons. |
| Fillbasket. | 16. Yellow Globe. |

STRAWBERRY.

The strawberry requires a deep, porous and highly enriched and well-drained soil. The best natural soil would be what is called a hazel loam—retentive, but not too adhesive—and trenched at least 3 feet deep, and the bottom of each spit enriched with 3 or 4 inches of well-rotted stable manure. This being trenched in in the winter or spring, the land should be kept moved and stirred about as much as possible until the plants are ready for planting.

The proper time to make new strawberry beds is the month of August; but if space of ground cannot then be had, or the time spared, it is an excellent plan to take the runners at that time and set them only a few inches apart in peat soil, on a north border, where they will soon make good root and become strong plants. In the early spring they should be taken up

separate, with a ball of earth, by means of a trowel, and planted a proper distance from each other in the bed intended for them.

In the market gardens this planting takes place in June, the market gardeners generally choosing an old celery bed; trenching it deeply, planting immediately, and watering copiously until the plants are established. Where this is not available the system is to prepare a piece of ground by trenching and manuring as above, and marking it into 4-feet beds, with 15-inch alleys between. In autumn or early spring a row of strong plants are planted in the alleys and the beds between cropped with summer lettuce. As the strawberries advance in growth the young plants from the runners are carefully layered among the lettuce, and soon become strong, vigorous plants, producing heavy crops of very large fruit.

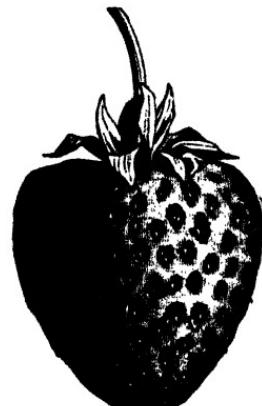
The following are good varieties of early and late strawberries :—

EARLY.	LATE.
1. Vicomtesse Heri- cart de Thury.	14. Sir Charles Napier.
2. Laxton's Noble.	15. Elton Pine.
3. King of Earlies.	16. Eleanor.
4. John Ruskin.	17. Frogmore Late Pine.
5. Competitor.	18. Enchantress.
6. Keen's Seedling.	19. Roden's Scarlet Pine.
7. Sir Joseph Pax- ton.	20. Unser Fritz.
8. Dr. Hogg.	21. Wonderful.
9. James Veitch.	22. Aberdeen.
10. President.	23. Lord Suffield.
11. British Queen.	24. Newton Seedling.
12. Gross Sucre.	25. Latest of all.
13. Royal Hautbois.	

VINES.

Difficulty of Culture in the Open Air.—It is certain that our moist and cloudy climate is not favourable to the ripening of the grape; its cultivation in the open air, therefore, requires great care; and in many seasons the most skilful management will fail to bring it to perfection. Nevertheless, the graceful trailing habit and beautiful foliage of the vine render it highly ornamental on the walls of a house; and for this it is worth cultivating, with the prospect of some fruit in favourable summers.

Propagation by Cuttings.—The vine is propagated by cuttings and by layering. Cuttings, made early in March or the latter end of February, may be planted about the middle of March. The cuttings must be shoots of last year, shortened to about 12 inches, or three joints each; and if they have an inch or so of last year's wood at the bottom, it will be an advantage. They may be planted either in nursery rows until rooted, or planted at once where they are



"JOSEPH PAXTON"—GOOD TYPE OF STRAWBERRY.

to remain, observing in the latter case to plant them in a slanting direction, and so deep that only one eye or joint is above ground, and that close to the surface.

Propagation by Layers.—Vines are propagated by layering shoots of the preceding year, or of a part of the branch, laying them about 4 or 5 inches deep and covering them with soil, leaving about three eyes above the ground; they are also layered in large pots, either by drawing the branch through the drainage hole and filling the

pot with soil, or by bending the branch and sinking it 4 or 5 inches in the soil and pegging it down there; it may then either be grown as a potted vine or, when fully rooted, transferred to its permanent place on the wall or vine border.

Vine Borders.—To make a good vine border the soil of the border should be dug out for 3 or 4 feet, a solid concrete bottom formed, with thorough drainage to carry off the water, and the border filled in again, first with bones and other animal remains, then with lime rubbish where that is available, and the surface with good loamy soil. In this soil the vine should be planted, the roots being previously trimmed and spread out horizontally, so as to radiate in a half-circle from the crown of the stem. Under such an arrangement as this the vine comes rapidly into bearing.

General Pruning and Training.—When the vine is approaching a bearing state, and the leaves have fallen, a general regulation of the shoots becomes necessary. In every part of the tree a proper supply of last year's shoots, both lateral and terminal, should be encouraged, these being the principal bearers to produce next year's fruit. All irregular and superabundant shoots should be cut out, and with them all of the former year's bearers, which are either too close to each other or which are too long for their respective places. Where it is not desirable to cut out the branch entirely, prune it back to some eligible lateral shoot, to form a terminal or leading branch. Cut out also all naked old wood. The last summer's shoots thus left will in spring project from every eye or bud young shoots, which produce the grapes the same summer. The general rule is to shorten the shoots to three, four, five, or six eyes or joints in length, according to their strength, and cutting them back from half an inch to about a quarter of an inch at every eye, the strongest branches being limited to five or

six joints, except where it is required to cover a vacant space on the wall. When left longer, the vines become crowded, in the following summer, with useless shoots, and the fruit is smaller in consequence. This pruning should be performed early in spring, even as early as February: in pruning at a later period, when the sap has begun to ascend, the wound is apt to bleed when the thick branches have been cut off. A second pruning should be performed about the middle of May, when the grapes are formed and the shoot has attained a length of 2 or 3 feet; at this time pinch off the shoot about 6 inches above the fruit and nail it to the wall in such a way that the fruit may be in contact with it. About midsummer a third pruning should take place, when all the branches should be gone over and the fruitless ones, not required for next year's wood, removed. A vigorous vine will require a fourth and final pruning in August, when the long shoots from the previous stoppings must be shortened back again, and all leaves lying too much over the bunches of fruit removed; taking care to prune, however, in such a manner that there is always a succession of young branches advancing from the lower part of the stem properly furnished with bearers, as well as a sufficient supply of young wood to replace the old as it becomes unserviceable. The pruning finished, let the branches be nailed or tied neatly to the wall or trellis, laying them regularly 6, 8, or 10 inches apart. Vine-pruning may be performed any time during the winter months, when the weather permits; but the sooner the work is done the better. The young shoots of last year produce shoots themselves the ensuing summer: and these are the fruit-bearers, which are to be trained horizontally or upright, according to the design of the tree.

Management of Fruit.—During August the fruit itself requires attention. Where

the branches are entangled, or in confusion, let them be regulated so that every branch may hang in its proper position. All the shoots that have fruit hanging on them, or which are ranging out of bounds, may be stopped, and where the grapes are too much shaded during August and September, remove a few of the leaves which intercept the light and heat. They should now have all possible aid of the sun to enrich their flavour. It will be necessary now to protect them from birds, wasps, &c., by bagging the best bunches in gauze or paper bags. In October the bunches are ripe to bursting, and ready to gather, preparatory to a new year of growth and decay. Bear in mind that success depends on well-ripened wood — a short-jointed branch, ripened under an August sun, being a fruitful bearer of highly flavoured fruit, and for this purpose a light porous earth is preferable to more tenacious clay soils. When the bunches of grapes are formed, pinch off the leading point of the growing shoot one joint above that from which the bunch proceeds. This is done to check the tendency of shoots to overlap one another. After the young points have been stopped, each joint below the stopping will put forth a side-shoot. These are termed lateral shoots. While this close stopping limits the extension of the tree, the size of the berry is much increased. This stopping is continued till the stoning period commences. This process occupies six or eight weeks, during which the growth of the fruit remains stationary, and the leading shoots may be suffered to push where they may.

Spur Pruning.—Pruning varies with the fancies of the operator. Spur-pruning consists of carrying up one leading shoot to the whole extent of the house or wall, either at one year's growth, or two or three, leaving spurs or lateral shoots to develop

themselves at regular intervals on the stem. This is usually the result of three years' growth, the cane being allowed to make a third of the length the first year, a second third the second year, and the remaining third during the third year. There will thus be five branches the first year, ten the second year, and fifteen the third year. The subsequent pruning is confined to pruning each of the laterals back to the last eye at the base of the shoot.

Long-rod Pruning.—This consists in establishing a stump with three strong branches or collars, from each of which, in its turn, a shoot springs, which, by a regular system of pruning, is worked in successive lengths, the one running the whole length of the rafter, the second half the length, and the third, recently pruned back, is to produce the renewal shoot.

Sorts.—Black Cluster ripens in July, in situations where the Black Hamburg fails. Miller's Burgundy, known by its white downy leaf, is very early and hardy. White Sweetwater is an early sort, with a fine large berry, but sets badly. White Muscadine is excellent for all purposes. In addition to the above sorts, which are useful for culture out of doors, may be named Esperione, Ferdinand de Lesseps, and Leicester. For indoor planting in a cool house may be named Black Hamburg, Foster's Seedling, Buckland's White Sweetwater, Meredith's Black Alicante, and Mr. Price's Black Muscat, of which the last is a late grape.

Black Hamburg ripens out of doors in fine seasons, but is very capricious in colour. White Frontignan is a fine early grape, sweet but insipid. Muscat of Alexandria requires artificial heat to ripen, but is one of the richest grapes in cultivation. West's St. Peter and the Cannon Mill grape are both favourites for house-culture.

PART V.

THE PESTS OF THE GARDEN.

 VERY animal or creature endowed with life, that it has pleased the Almighty in His infinite wisdom to create, has, without doubt, its useful purpose to serve, and yet how many of them are, and must be, regarded by men as "pests of the garden"—plagues that oftentimes hinder the progress of plant life, or destroy it outright, of which man would fain rid himself at a single stroke could he do so, even as one of the Cæsars wished that the entire Roman people had but one common neck, so that he might disencumber himself of the nation that groaned under his oppressive rule in a moment by just one sweeping blow of a trenchant sword.

If each and everything that is reckoned as a garden pest has some God-given mission to carry out, it is natural to inquire what that mission may be. Is it to rouse God's masterpiece to greater industry, greater watchfulness, and greater care than he would otherwise be disposed to employ were it all plain sailing—progress without a stumble over Nature's field, as easy as the passage of a ship over a sea scarce rippled into wavelets by the gentle breathing of a western wind under a cloudless sky? We are taught and told that at the Fall God cursed the ground for man's sake, and permitted thorns and thistles to grow in rank array among the herbs that the earth up to this point had bounteously yielded to furnish man with food. Man had to live a life of industry and toil, and is it not possible that the thorns and thistles were allowed to mingle with the herbs of the field as blessings in disguise to compel him to that industry and toil which God had imposed on him as part of the penalty that he had to pay for his sin of disobedience to God's command? And if we can accept this view it is possible to accept the other also.

But be this as it may, it is impossible to deny that some of the animals that are classed among garden pests are useful in many ways: that a thoughtful mind will readily recognise. For example, let us take the mole, which works unseen and hidden underground, and only marks his track and leaves his traces in the tiny hillocks, whose upheaval on earth's surface is caused by the earth that it removes from his galleries and passages, made by the little excavator as he works his way in darkness through the soil. The mole eats roots, it is true, and disturbs growing crops if it makes its passages under the ground in which they happen to be; but, on the other hand, his workings promote the drainage of the surface soil, and admits the air into the soil, and the mounds of earth which it throws up, when

INTRODUCTORY.

scattered over the surface, and especially over the surface of grass land, acts as a fertiliser, and promotes the growth of the grass. Thus moles are useful, and possibly everything that has life, and is endowed with capability of motion, has its use could we divine it.

Among pests of the garden in a secondary degree must be reckoned dogs and cats ; dogs are more easily kept out, and may be trained to avoid being harmful to the ground, but cats, and especially our neighbours' cats, having a propensity to meddle with ground that has been newly turned and made up, cannot be so easily managed. Means and modes of checking the inroads of cats will be found in the pages that immediately follow, and also of dealing with mice and moles, which complete the list of four-footed creatures that do damage to the garden in one way or another.

Birds are highly detrimental to the well-being of the garden. Fowls, if they unfortunately affect an entrance, play havoc by scraping and scratching in quest of insect food, by digging shallow pits in dryish mould wherein to dust themselves, and by helping themselves to any green stuff that may be growing in a garden, especially the cabbage tribe, turnips, &c. Then some kinds of birds do infinite damage to fruit, quickly clearing even a well-laden tree of cherries in an incredibly short time ; others, again, do damage to the young buds, disembowel promising pea-pods, strip currant bushes of their fruit, nip off the tops of young peas just above ground, and do much other damage which some say is counterbalanced by the service rendered by some in clearing away caterpillars. The frequent discharge of a gun is the best deterrent for birds, but other ways of dealing with them will be shown presently.

The chief pests of the garden, however, are to be found among insects. The caterpillars of the white butterfly honeycomb our summer cabbages ; other caterpillars infest gooseberry and currant bushes ; American blight (*Aphis lanigera*) injures our apple-trees ; green and black fly batten on the tender shoots of a large variety of growing plants, including roses ; earwigs lurk in the blooms of roses, dahlias, and other flowers that afford a hiding-place for them ; thrip, red spider, and scale do an infinity of harm in greenhouses ; and wasps, &c., eat our stone fruit. It is unnecessary to prolong the catalogue of insect pests ; it is enough to say that suggestions for checking the ravages of many of them are offered in the fifth portion of this volume. It will be understood that it is only the ordinary garden plagues, and such as come immediately under the notice of gardeners, that are touched on. Such insects as the potato beetle, which gave such trouble in America, and the *Phylloxera vitis*, which at times has wrought such ravages on the vines in France, are not mentioned, for want of room. In a book of limited space it is impossible to deal with everything, but it may be said that most things have been dealt with which would come under the notice of the ordinary gardener in his ordinary work.

ABRAXAS GROSSULATORIA. See Currant Moth.

ACARUS. See Red Spider.

AMERICAN BLIGHT.

A woolly looking substance found on apple-trees and other trees of the same class, proceeding from a species of insect called by some *Eriosoma lanigera*, and by others *Aphis lanigera*. The insect is subject to rapid increase, and infests the bark—entering the cracks and piercing the sap vessels from which it extracts, the juice, causing wounds which canker, and ultimately destroy the branch. In the winter it retreats to the bottom of the trunk, where it lies dormant during the winter, reascending to the branches in the spring. The trees should be brushed with a stiff brush, and a lather of soft soap applied in the winter, and on any reappearance of the insect in spring after this, paraffin or petroleum should be freely used, and well rubbed into the bark with an ordinary paint-brush, which penetrates the cracks and crevices in the bark all the better if half worn out.

ANTHONYIA. See Cabbage Fly and Onion Fly.

ANTS.

In order to destroy these insects, place an inverted garden-pot over the nest, and the ants will work into it. Remove the pot in a day or two by placing a spade underneath it; then plunge it, with its contents, into boiling water, and repeat the process if necessary. Ants may be expelled from any particular plant by sprinkling it well with sulphur; they may also be kept away from wall-fruit, and other fruit while ripening, by drawing a broad band with chalk along the wall near the ground, and round the stem of the

trees. Ants may also be destroyed by pouring boiling water on the nest, or by a mixture of sugar and beer in which arsenic has been mixed. Chloride of lime will also drive them from their haunts.

APHIS (plur. APH'IDRS).

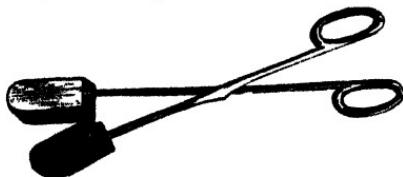
Aphides, or plant-lice, and their congeners, are indicated by an unhealthy appearance in plants; the leaves and young shoots curl up, and multitudes of ants, which seem to feed on their secretions, are seen about the stems. A remedy is found in repeatedly syringing the leaves and stems with tobacco or lime-water, or with gas-tar water when that can be obtained; but plants should be carefully examined in May, and the winged parent of the *Psilla Pyra*, and its congeners, destroyed before they have deposited their eggs. Lady-birds (*Coccinellidae*) render great service in destroying myriads of aphides, which ought to insure them the protection of gardeners. Tobacco smoke, dispersed through a house by a fumigator, and Gishurst's Compound are effectual in clearing plants of green fly; but if fumigation is resorted to, all apertures must be effectually stopped, so that the smoke may be retained within the structure, and so thoroughly do its work.

APHIS BRUSHES.

When the aphis, or green fly, collects in great numbers on the end of a shoot of any plant, such as the rose, covering it with a thick external coating of insect life, it has been found that they may be easily removed by means of aphis brushes. These brushes are made in the form of scissors, as shown in the accompanying illustration. At the end of each arm is a narrow brush formed of soft bristles. The brushes are closed on the infested shoot a little below the insects, and then drawn upwards and along it. Two or three applications

BIRD SCARERS—BIRD TRAPS.

the brush will very nearly, if not entirely, remove all the aphides without doing any injury to the shoot. Sometimes the aphis brush is made in the form of sheep shears—that is to say, an elastic steel bow, with

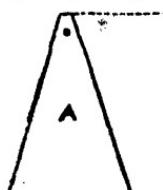


APHIS BRUSHES.

a brush at the end of each arm. Pressure only of the thumb and fingers is required to bring the brushes together, and the shoot is cleared as before by drawing the brushes along it. The cost of an aphis brush is 1s. 6d.

BIRD SCARERS.

Glitter is as objectionable to birds as noise. This may be obtained by suspending small pieces of looking-glass in trees. The bits of glass may be framed in strips of tin, and the framing will afford an easy means of hanging them at an angle, which is better than placing them perfectly straight.



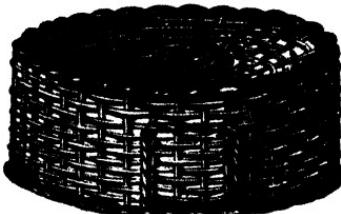
Odd bits of bright tin may be utilised in this way by cutting them in the form shown at A, which represents the front view or elevation of a piece of tin thus treated, and then putting two together as shown at B, which affords an end view of the contrivance. Pieces of tin put together in this

keep up a rattling noise, as well as twig, C, when its weight will destroy the

emit flashes of light as the sun's rays fall on them, and thus constitute cheap but very effective bird scarers.

BASKET TRAPS FOR BIRDS.

Bird traps may be procured at the basket makers, circular in form and the top funnel shaped, having a small wicker door on one side. Corn is strewn at the bottom of the basket as bait. The bird

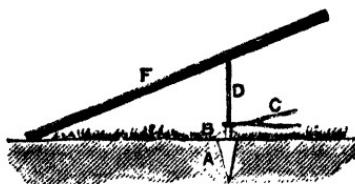


forces its way into the trap to get at the corn, and cannot get out again through the ends of the opposing osiers. When caught it must be taken out and destroyed by the catcher.

SIMPLE TRAPS FOR BIRDS.

The accompanying diagram shows the principle of setting traps which will kill birds. A peg, slightly rounded at the top, is driven into the ground as at A, to afford a solid support for the contrivance immediately above it, which consists of a short piece, B, a forced twig, C, and a longer piece of wood or stick, D. Of these, B is placed on A, and D immediately above B, the forked twig, C, being interposed between B and D, as drawn. A heavy stone, slate, or brick is then placed on D, the whole being carefully balanced. The corn, or whatever may be used as bait, is scattered under the stone between B and the edge of the stone touching the ground. In approaching the bait the bird will at first light on the forked twig, C, when its weight will destroy the

balance, displace the sticks, and bring down the stone. When it is desired to entrap the bird alive, four bricks are used—one on each side, one at the end, and the fourth in the position shown for the stone F. The means used to prop up the fourth brick are precisely the same, but when the sticks are displaced and the brick falls, its edge is caught by that of



the brick at the end, and the bird is secured in the cavity formed between the four bricks. A sieve propped on a stick, with a string tied to it, affords another kind of drop trap in which birds may be taken, but this necessitates long watching on the part of the person who has to let the trap down by pulling the string, and therefore need not be described further.

CABBAGE FLY.

A fly whose larva or maggot causes injury to cabbages in the summer, causing the leaves to assume a yellow and blighted appearance, and to droop under the sun's rays. When the presence of this pest is known or suspected the plants should be removed and burnt, and the ground in which they have been growing should be heavily salted or dressed plentifully with lime. The fly is grey in colour, the male being darker than the female.

CALCEOLARIAS, GREEN FLY ON.

Green flies hold carnival among the soft delicate leaves of all kinds of calceolarias, and unless speedily destroyed will consign the entire stock to the rubbish heap. For-

tunately, the flies on these and cinerarias seem to be partially assimilated to the nature of their food, being very soft and easily destroyed.

CATS IN GARDENS.

To keep a cat out of a garden is a matter of the greatest difficulty ; nevertheless, it is to be accomplished by contrivances which shall now be described.

Wire Defences.—To cover the top of a wall with bits of broken glass and bottles offers no bar to the progress of the adventurous cat. The tenderest points in a cat are his feet, and he has a decided objection to trust them on wire, and especially on fine wire. He or she, as the case may be, for the ladies are no better than the gentlemen, will climb up wooden trellis as easily and as coolly as a man goes up a ladder, but wire netting pussy cannot and will not climb, out of respect to his poor feet. Therefore, when the walls of a garden are surmounted by wire netting from two to three feet in height, stretched from end to end, supported on iron stakes inserted in the top of the wall, and secured at the bottom to the wall itself at intervals, there is no possibility of creeping under it, grimalkin's desire to enter the garden and work his will in it is balked, and he is effectually prevented from entering it. The netting is too high for him to jump over, and he will not try to climb over it more than once.

Wire Entanglements.—Among other modes in which wire and wire netting may be utilised are the following. It would be a good thing if the top of walls were formed on the slant, as in Fig. 1, either on both sides or on one, as shown by the dotted lines. Formed in this manner, the tops of walls might be better utilised for the reception of coping to protect the blossom of the trees in early spring ; and if there be any objection to the limited amount of rain that

CAT TEASERS.

would find its way down the face of the wall, it could be carried off by very simple guttering. The great object is to make the tops of garden walls as objectionable as possible to the cat as paths and roadways, and, as a matter of course, the more slanting the top of the wall, the less easy will it be for the cat to canter along it. However, his

FIG. 1.—WIRE NETTING OVER TOP OF WALL.

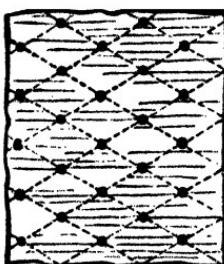
progress may be seriously impeded, if not entirely stopped, by bending a piece of wire netting over the top of the wall from end to end, as shown in section at the top of Fig. 1. What with the slanting top and the "wire entanglement," to use a military epithet, into which his legs must be plunged to the whole length at every step that he takes, advance along a wall thus protected would be utterly impossible. Another plan that greatly perplexes poor pussy is to erect broad uprights of wood or iron from end to end of the wall at suitable intervals, and to strain wires along them so as to form a serrated fencing. When an arrangement of iron uprights and wires is formed similar to that shown in Fig. 2, the wires being placed about $\frac{1}{2}$ inch or even 2 inches apart, the wires on the external uprights being opposite to each other, and those in the centre upright just midway between these, a wire obstacle will be formed of such a kind that no cat will be able or willing to force its way through it. Of course there are other means of arranging the wires, but these will readily suggest themselves to an ingenious

and inventive mind according to the situation.

CAT TEASERS OF NAILS.

An effective finish is sometimes imparted to park palings by nailing a strip of wood, bevelled on each upper edge, along the top of the paling, nails about three inches long having been previously put through the strip, point uppermost, at the distance of $\frac{1}{4}$ inch apart. It is worth while to consider how the principle of the bayonet finish to the park palings can be applied to the case of the cat. We must touch his feet again, and make any place that he is accustomed to climb over as uncomfortable to him as possible—indeed, so uncomfortable as to make him reluctant to try the same road again. Cats will run up a fence, or the side of a glass house, or any building that is not too high, and pull themselves on to the roof by placing their feet on the edge before hoisting themselves up. Supposing, for example, we have a wooden paling on the edge of a greenhouse on which cats are in the habit of climbing, and we wish to stop them from doing so, the best thing is to take a single strip of wood, or two strips if the wood coping of the paling slope on both sides, and cut it to suit the width of the coping or edge. The wood should be from $\frac{3}{8}$ inch to $\frac{1}{2}$ inch thick, and as free from knots as possible. Plane the wood up on both sides, and then draw diagonal lines all over one side of it, the bottom in fact, as shown by the dotted lines in the accompanying illustration; then at every crossing insert a 1-inch rivet of the kind used by

FIG. 2.—WIRE OBSTACLE ON TOP OF WALL.



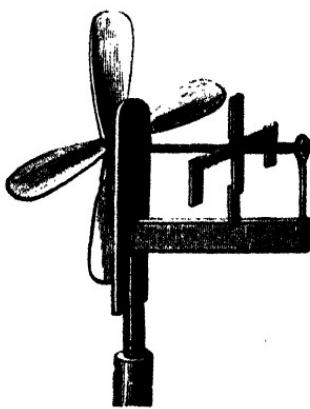
CAT TEASER OF NAILS.

shoemakers, and which are finer than the French wire nails of this length. When finished, turn the strip up and nail it to the paling or edge of roof, the nails that have been driven into it being point uppermost. The cat will not relish his reception when he, or she, next attempts to come that way.

CHERRY CLACK.

With birds, as with human beings, it is found that too much familiarity breeds contempt, and that however cleverly scarecrows may be constructed their want of motion begets suspicion in the birds that they are intended to alarm; and finding eventually that the supposed guardian of the seed or fruit, as the case may be, remains silent and motionless, they draw nearer and nearer, and ultimately hop round it and about it, treating it with the contempt that it fully deserves. Motion, noise, and glitter are the things which birds mostly dislike. They will avoid pieces of paper and feathers tied to string or twine and stretched over seed beds, though the string, if plainly discernible, will keep them off, even without paper or feathers attached to it. The fluttering of the paper is strange to them, the net-like cords abhorrent, and they keep away from the spot that is thus protected. Figures of soldiers and sailors, whose arms end in fans that are turned by the action of the wind, formed in the semblance of broadswords, are disliked by the birds on account of the whirling and twirling that they keep up in every direction, according to the way of the wind. But worse than these is the appliance known as the cherry clack, which turns about as rapidly as these, and keeps up a perpetual rattling in even a moderately brisk breeze, with its castanet-like fittings. The cherry clack is figured in the accompanying illustration, and consists, first of all, of a long axle, having four fans, slightly inclined to a plane at right angles to it, placed at one

end. When the wind blows, its pressure on the fans causes the axle to revolve with greater or less rapidity. The axle is sustained by a framework, consisting of an upright piece fitted to another piece of wood, which is bored through to receive a pin set on a pole on which the whole affair will turn. A broad piece of wood is mortised to the first piece, and placed in a horizontal position, and from the end of this rises a small support to carry the other



CHERRY CLACK.

end of the axle. At a point intermediate between the supports a framing in the form of a cross is fixed, and to the end of each arm a piece of hard wood is loosely jointed by a pin, on which it turns freely. As the fans turn, carrying with them the axle and the cross that is fixed on it, the pieces of wood knock in succession against the horizontal piece of the support, and keep up a rattle that is anything but pleasant to those who are within earshot of it.

CURRENT MOTH.

This moth often mistaken for a butterfly, is also known as the Gooseberry Moth and Magpie Moth. It is white patched and spotted with black, with a

DANDELIONS—EARWIG TRAP.

band on the fore-wings running between the black spots, and a yellowish patch at the base. The grub or caterpillar is white and orange, with black bands at the joints. The chrysalis is black, with orange rings round the segments of the body. The moth is chiefly injurious to gooseberry and currant trees, and also infests the almond, peach, and sloe. It appears in the summer, and deposits its eggs on the leaves of the bushes mentioned. The caterpillar appears in September, and continues in this state throughout the winter. It enters the chrysalis state from the middle of May to the end of June, and the moth emerges therefrom from about the middle of June onwards. The caterpillar is best destroyed by handpicking in September, or by dusting the bushes with tobacco powder, or white hellebore in the form of powder, or even with soot and air-slaked lime well mixed. These should be applied when the leaves are damp. All fallen leaves should be raked together and burnt. It is a good plan to dress the ground on which the plants grow, both in spring and autumn, with a mixture of soot and lime.

DANDELIONS, TO KILL.

Cut the tops off in the spring, and place a pinch of salt, or a little gas-tar, on the fresh wound. It must be borne in mind that the root of the dandelion, when boiled down, makes an excellent tonic especially useful in liver complaints. Further, the young shoots of the dandelion may be rendered available for salads, by treating roots in winter in the manner described for chicory, *which see.*

DREDGER FOR LIME AND SOOT.

For caterpillars, slugs, &c., a dressing or sprinkling of lime or soot is most useful, either when applied to themselves when visible or to the plants on which they feed or the plants they frequent. Salt is also a

deadly poison to slugs. The difficulty that most people find is in procuring means for the application of the powder. An old flour dredger that is past kitchen use will answer the purpose admirably; but if nothing of this kind is available, a dredger can be easily made out of a cylindrical tin can, as shown in the accompanying illustration. At A the perforated cover is shown in plan. To make this, the cover should be placed on its outer surface on a piece of hard wood or lead, with the inner surface uppermost. Find the centre, and with a pair of compasses trace some fine circles, as shown in the illustration. Then, with an old bradawl that has been sharpened to a point, make holes in the tin along the circles that have been described, driving the bradawl point through the metal by striking a smart blow on the handle with a hammer.

EARWIG TRAP.

Earwigs love concealment, and if discovered will make for the nearest hiding-place without a moment's delay. On this account they will plunge into the hearts of dahlias, roses, carnations, and all flowers of sufficient size and such structure as to enable the earwigs to utilise them for shelter. Hence it is that hollow sticks, made of pieces of elder with the pith cleared out, flower pots on the top of a stake, and cabbage leaves, &c., are recommended as means of entrapping earwigs, &c. Cabbage leaves are all very well as tempting cover for slugs, &c., which cannot make good their escape in a hurry, but earwigs can and will, as soon as the leaf, stick, or flower pot is disturbed by the



touch of the gardener. The good and simple kind of trap is a wooden or metal box, formed as shown in Fig. 1, and having a hole at the top, in which a funnel-shaped glass is placed. The earwigs, &c., make their way into the trap down the funnel, but cannot get out again, and when there they may be killed by pouring boiling water on them.

GOOSEBERRY CATERPILLARS.

These pests are exceedingly prevalent, and at times in some parts of the country the gooseberry has been nearly destroyed by them. They come principally from a saw-fly, which lays its eggs in rows along the under-ribs of the leaves, and after having committed its ravage, falls to the



FIG. 1.—SIMPLE EARWIG TRAP.

ground, where it lives in the pupa state till the following season. The bushes should be carefully looked over once a week to watch the hatching of the eggs, when the infected leaves may be picked off. To prevent the fly from settling, the bushes should be dusted over with hellebore powder, or watered with a strong decoction of the *Digitalis*, or common foxglove. If the caterpillar has begun its ravages, the ground beneath the bush should be sprinkled with new lime, and a double-barrelled gun fired two or three times under it to shake the caterpillars down into it. The most effectual preventive, however, is to remove the top soil from under the bush during the winter time, and destroy the grubs in it by mixing it with salt or soot: the parings so mixed may be buried or entirely removed, and new soil placed round the roots instead of it.

Layers of bark from the tan-yard, when used as a covering of the soil underneath the bushes, have been found very useful in destroying the insect in its chrysalis state. In the autumn or winter, when digging between the bushes, sow the whole ground over with fresh-slaked lime, using a liberal supply of lime, more particularly round the stems and about the roots of the bushes, forking the ground over. About the middle or latter end of March repeat the application, more especially round the roots, and rake the ground in, repeating the operation in two or three weeks. Few caterpillars will survive this treatment.

GREEN-FLY.

Fumigate with tobacco the plant infected, and syringe it well afterwards with clean water, or, if it is not possible to fumigate, wash the plant with strong tobacco water by means of a soft brush.

INSECTS.

As all insects are produced from eggs, and as a natural instinct enables the mother to place the eggs in a spot where they will not only be safe, but where the young grub will find food to support itself until its first transformation takes place, a knowledge of the habits of the more destructive species is absolutely necessary to the gardener; the most effective remedy being to destroy the egg; for the caterpillar or larva state is that most destructive to vegetation. In this state the name of caterpillar is applicable to lepidopterous insects or moths, and butterflies, and some of the Hymenoptera, or bees. Grubs are the larva of beetles, generally with three pair of feet, strong jaws and fat misshapen bodies; maggots are the larvae of flies, moving along the ground by the muscular action of the rings of the body; the larvae of bees and ants being also generally called maggots.

When the larvae of these creatures have exhausted the food near which the provident care of the mother has placed them, they are generally prepared for their second transformation—viz., the pupa or chrysalis state; winding themselves in their cocoons, they bury themselves in the earth, or in some other obscure place, and emerge in a few hours in forms as various as were their larvae, the beetles with rudimentary feet, which are developed in their perfect state; the butterflies naked, suspended by the tail, or attached to the branch of some tree or wall; the moths enveloped in a bag or cocoon, which they have spun round themselves, as in a shroud; the flies and two-winged insects, smooth oval substances, are fixed to the plants or trees which have supported the larvae. At length their last metamorphosis occurs: the caterpillar becomes a moth or butterfly, gaily painted in its garb of summer; the grub becomes a beetle, with its diaphonous-coloured, hard, shining shell; the maggots develop themselves in thousands of shapes, floating and humming in the air,—the two-winged insects, or Diptera.

All the mischief, however, has been done, so far as the garden is concerned, and the gardener has only to look forward, as he ever must, to the next season. The insects humming and buzzing around him are short-lived: one object of their creation has been obtained; they have performed, so far, their office of scavengers; their next is to perpetuate their species; and the object of the gardener must be to circumvent them here, by destroying their eggs as they are deposited.

INSECTS' EGGS, DRESSING TO DESTROY.

An excellent dressing to destroy the eggs, &c., of insects that infest the bark of trees and old walls is made in the following manner.—Take $\frac{1}{2}$ lb. of tobacco, $\frac{1}{2}$ lb. of

sulphur, $\frac{1}{2}$ peck of lime; stir these ingredients well together in three or four gallons of water; leave them to settle, and syringe the trees and walls well with the clear liquid. More water may be added when the first is used up.

INSECTS ON ROSES.

There are no class of flowers so much exposed to the depredations of insects as roses, and no remedy can be applied to



ROSE BEDEGUAR. AN EXCRESCEENCE.

their depredations without a precise knowledge of their habits and different states of transition. The rose bedeguar or excrescence found very frequently on the wild rose, shown in the accompanying illustration, is the work of a gall-fly known as *Rhodites rosea*. The ravages of the *Aphis rosea*, or green fly, on the tender shoots of the rose are well known to all. *Anisophia horticola* is a beetle which infests the flowers of the rose about June, but its maggots do not prey on the plant. Moths, beetles, and gall-flies, and other insects

hardly known to the initiated, seem to unite their forces in order to attack the queen of flowers. During June and July, the golden rose-beetle (*Cetonia aurata*) may be seen wheeling round the rose-tree, with its low hum, its wing-cases and elytra erect, instead of being extended from the body. It feeds upon pollen and honey, and in doing so bites off the anthers of the flowers, while its larvae feed upon decaying wood and vegetable matter, burying themselves in the ground like the cockchafer.

Among the moths, the rose tortrix (*Tortrix Bergmanniana*) is distinguished by the rich golden yellow of its breast and fore-wings, slightly clouded with orange, and bars of purple-brown with silvery scales. This moth, in the caterpillar state, is very destructive round London to roses. The moths deposit their eggs in the summer in the incipient buds, and they commence operations as soon as they appear, attaching themselves back to back by their thread-like fibres. Round these leaves others grow in distorted shape, while the caterpillar revels on its core, devouring the petals of the flower as well as the leaf. When disturbed, the caterpillar drops down, suspended by a thin web which it spins, and by which it is able, when the danger disappears, to resume its former position. The only method of destroying these insects is by sharply pinching the buds where they are suspected to be in the early spring; this will relieve the plant, and enable it to throw out fresh leaves. If allowed to arrive at maturity, the moths should be destroyed as soon as they appear, and before they can deposit their eggs. The ashy-white bell-moth (*Spilonota aquana*) is another moth of the *Tortricidae*, which has been reared from the leaves of the rose, and of habit similar to the preceding. The yellow-tail moth, which has usually been found on the oak,

the elm, and the blackthorn, has also been found on Scotch roses, feeding upon the petals, and afterwards attacking the leaves. This moth appears at the end of July, and the caterpillar (which is thickly coated with long black hairs) feeds also on the pear.

INSECTS ON PEAR-TREES.

Pear-trees are subject to the attacks of several species of lepidoptera, saw-flies, and aphides. Among the lepidoptera, the beautiful moth *Zenzena pyrena*, with its antennae feathered on each side, is furnished with an elongated telescope-like ovipositor, with which the female deposits the eggs to a considerable depth in the crevices of the bark of the tree. The perfect insect appears in July, and the caterpillars in August, when they immediately burrow into the wood of the tree. In September they moult, and in the following June they are full-grown. Sparrows are the gardener's best ally in destroying this insect in the perfect state. Several other small lepidoptera are injurious to the pear. *Tinea clerckella*, one of the Tineidæ, deposits its eggs on the under surface of the leaves towards the end of May. The young larvæ penetrate the under cuticle, and feed on the fleshy parenchyma, leaving the surfaces untouched, giving the leaf a flabby and blistered appearance. The Chaumontelle is said to be particularly subject to the ravages of this creature, especially in the beginning of autumn. The *Selandria Ethiops*, or Pear Saw-Fly, is particularly destructive to the leaves of pear trees in July, August, and September, which are then infested by its grub, generally known as the slimy grub. The *Aspidiotus ostraciformis*, or Pear Tree Oyster Scale, is one of the pests that infest pear-trees. The *Aphis pyrimali*, or Tree Aphis, attacks both the pear-tree and the apple-tree.

MICE.

Much harm is done by mice in gardens to peas newly sown and just growing and to bulbs, which they gnaw and eat and thus destroy. They are especially harmful to crocuses, and will do injury to most seeds of a large kind, such as the seeds of cucumbers, melons, vegetable marrows, &c. It is supposed that they are guided to the seeds by their acute sense of smell, and it is said that rows of peas covered with a coating of ashes are never touched by them, in which case the ashes will have acted as a deodoriser and destroyed the scent which would otherwise have led the mice to the peas.

MICE, TRAPS FOR.

Some gardeners have used the common mouse trap with good effect, oiling the wires to preserve them from rusting, or smearing them with grease. Perhaps the simplest and cheapest trap of any is a pickle jar sunk to the brim, or very nearly so, in the earth, as shown in Fig. 1. The rim and the inside of the jar as far as the

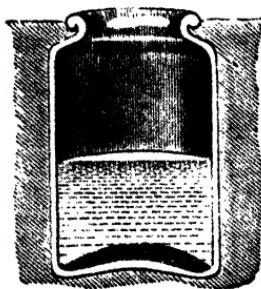


FIG. 1.—PICKLE JAR AS TRAP FOR MOUSE.

shoulder should be liberally smeared with grease, and the jar half filled with water. A little corn, lumps of grease, &c., may

be placed on the earth in the immediate vicinity of the jar. The mice, being attracted to the trap by the grease, soon manage to slip over the rim into the water below, from which there is no escape.

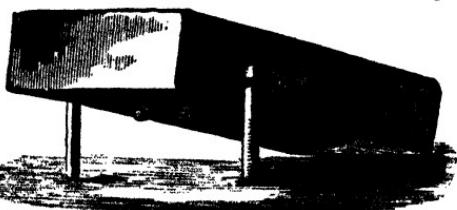


FIG. 2.—BRICK AS TRAP FOR MICE.

Another cheap and effective trap may be made of a brick, but as this only disposes of one mouse at a time, and must be re-set before another can be caught, it is not as useful as the jar that has just been described. A piece of slate of the same width as the brick should be obtained and placed on the ground, and the brick then set on edge over the slate, as shown in Fig. 2. The support for the brick is made of a piece of thread about 10 inches long, with a knot at each end, inserted in slits made in the ends of two short sticks, which are stuck into the ground, one on each side of the brick and slate. On the thread two growing peas are strung, or two kernels of nuts, and the thread itself should be well greased. The mouse, standing on the slate, is tempted to gnaw the peas or nuts and the thread between them, the peas, &c., being placed about 1 inch apart; when the string is gnawed through the brick falls and crushes the mouse. The object of the slate is to obtain a solid surface on which the brick may fall; if there was a cavity in the earth the mouse might take refuge therein, and thus make his escape, and otherwise, if the soil were soft, the poor animal might be partly driven into it and its death struggle unduly prolonged.

MILDEW.

Mildew is due to the presence of a fungus caused by parasites, and is often promoted by want of proper attention to ventilation.

Syringe the plant upon which the mildew has begun to make its appearance, with a strong decoction of green leaves of the elder; or use in the same way a solution of nitre, made in the proportion of one ounce of nitre to one gallon of water. A mixture of soapsuds and sulphur will, in many cases, answer the same purpose. Dusting with flour of sulphur is beneficial, especially in the case of grapes. Among preparations sold for the purpose of counter-acting the ill effects of mildew Ewing's Mildew Composition, used in the proportion of one ounce to one gallon of lukewarm water and applied with a syringe, is considered the best.

MOLES.

The mole does great damage at times to meadows, grass lands, and gardens, but it is doubtful if the harm done to lawns and meadows is really serious. The hillocks are unsightly, but they can be easily dispersed over the grass, and the runs in their immediate vicinity trodden down. It is in gardens, perhaps, that the mole does genuine harm, when it burrows under pansies, onions, &c., but it can do no injury to potatoes and strong growing crops. And the harm that it does in a garden is counterbalanced to a certain extent by the fact that it eats wireworms and large earthworms, the former of which are injurious to many plants. These trouble-some intruders, it is said, may be driven out of the garden by placing the green leaves of the common elder in their subterranean paths, for the smell of these is so offensive to them, that they will not come near it; or they may be poisoned by placing in their paths worms, which, for

some time, have been left in a place with a small quantity of carbonate of barytes.

MOLES, TRAPS FOR.

The old-fashioned mole trap is effective, but it requires nice arrangement, and it is only the professional mole-catcher that can manage it with decided success. The amateur gets puzzled in the endeavour to prick for their runs, and this is an equal objection to the iron trap sold by iron-mongers for catching moles at 7d. or 8d. If the run can be found in the immediate neighbourhood of the hillock, the trap can be set; but even then great care must be taken not to choke and destroy the run. Some advise opening the run and firing a piece of rag soaked in paraffin in order to drive them away by the smell, which is offensive to the moles. Others recommend watching for them at about 9 a.m. and 3 p.m., the times when they are said to leave the hillocks that they make, speaking generally, and then to dig under the place sharply and quickly with a fork, and thus eject the mole, and then kill it. But a waiting game is always tiresome, and it is probable that the concussion of the ground under the footsteps of the approaching gardener may frequently scare the mole, and render the plan abortive. When it is desired to get rid of them, the best course is to send for the mole-catcher. When the weather is hot, moles work deeply; when it rains and the worms rise to the surface, the moles work near the surface also. In watching for moles, the rising of worms to the surface is a sure indication of the presence of a mole below and near, and as soon as any motion of the soil is noticed, the fork should be thrust in as deeply as possible, in order to turn out the mole.

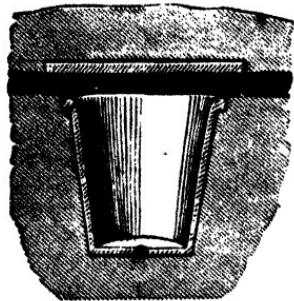
There is a contrivance for catching moles which has been proved to be effectual, and which can be easily made. This is merely a large flower pot—an old tin pail will

answer the purpose excellently — sunk beneath the ground upon a level with the floor of the run. A flat piece of board is laid over the run, and the earth heaped upon it so as to exclude the light completely. Its success chiefly lies in the perfect simplicity of the thing. The moles, seeing or feeling nothing with the highly sensitive "feelers" upon their snouts, run very readily into the trap, from which there is no escape. Every fresh arrival adds to the company, for there is no resetting required, and there is no disturbance of the ground to excite suspicion. Doubtless the movements of the moles

or damp weather, but not during rain. A strong solution of sulphate of copper, otherwise known as blue vitriol, has been found most effectual in eradicating moss.

MOSS ON LAWNS.

All remedies are useless until the lawn is well drained ; when this is done, rake the grass with a sharp-toothed rake in different directions to drag out the moss, and roll with a very heavy roller in wet weather. Nitrate of soda, at the rate of one and a half to two cwt. per acre, should be sown in the spring, over the mossy grass. Very fine coal ashes, also, may with great benefit be spread over those parts of the lawn where moss abounds, especially if done in wet weather, or before a soaking rain.



AN EFFECTIVE MOLE TRAP.

themselves attract other unfortunates to their ruin, for one who tried the trap with eminent success caught seven moles the first day, and three the second, after setting it.

MOSS ON FRUIT-TREES.

Wash the branches of the trees wherever moss appears with strong lime-water : strong brine made with common salt will also answer the same purpose.

MOSS ON GRAVEL WALKS.

Sprinkle the walks and yards over with refuse salt, but be careful to keep the salt from box-edgings and the sides of the grass. This sprinkling should be done in dewy

ONION FLY.

A fly of a grey colour whose grub or larva does much damage where it occurs to the onion, causing the young plants to turn yellow and the leaves to fall to the ground. It affects onions from May to September, and the best way to get rid of the pest is said to be found in sprinkling gas lime plentifully on the earth between the rows of onions.

RABBITS, PRECAUTIONS AGAINST.

Much injury is done to the bark of trees and many plants by the nibbling of rabbits. The best plan is to keep them out by suitable wire fencing ; but this is costly, and perhaps in some places impossible. A safeguard for individual trees is to place boards round the stem or trunk connected with hooks and eyes, so that they may be easily put up and readily shifted, or some sticks, about 1 inch in diameter, may be placed at intervals round and against the stem of the tree, and bound round from the bottom upwards with tarred cord as far as may be necessary. The remedy is an unsightly one, but it has the merit of being

effectual. Some recommend tarring the stems from the ground to the height of about 20 inches, but this is likely to prove injurious to the tree itself. Instead of doing this, it is better to drive in three or four stakes round each plant at the distance of 9 inches or 12 inches from it ; then tie a bit of fresh tarred line round the stakes at the distance of 9 inches from the ground.

RED SPIDER.

This is one of the most baneful of the insect pests that the gardener has to deal with either in the open air or in green-houses or hothouses, in which it is very prevalent when they have been kept too hot or too dry. There are various *acari* or mites which infest and injure plants, but this is accounted the most prevalent and therefore the worst of them. They are almost invisible even to the keenest vision, but their presence is indicated by the state of the leaves on which they are, and which present a burnt or scorched appearance, being brown, red, or yellowish in colour in patches, or over the entire leaf. Green-house walls should be dressed with a mixture of soft soap, sulphur, and clay, beat up to the consistency of paint with warm water, and the same dressing may be used for trees. Fumigation with flowers of sulphur vaporised on hot plates is also useful, the houses, pits, &c., being carefully closed while the work of destruction is in progress. After fumigation the plants should be well syringed from time to time with fresh clean water.

SAW-FLIES.

Among the saw-flies, so called from the females possessing a saw-like apparatus at the extremity of the body, *Cladius pectinicornis*, which is very destructive in gardens, measures a sixth of an inch in length, and is black and shining in body, with dirty yellowish-white legs. It feeds upon the

leaves of various kinds of roses ; the caterpillars are found feeding on them in the beginning of July, remaining in the pupa state a fortnight or three weeks, when they appear as perfect insects. There are many other saw-flies which do great damage to roses, gooseberries, currants, &c., but they need not be named and described individually here. To get rid of them shake them from the bushes and remove the soil on which they fall, or sprinkle the bushes with powdered sulphur, or with water to which hellebore has been added.

SCALE.

An insect that infests and does much injury to many trees and plants both under glass and out of doors. The males are in the form of small flies. The females look like small plates or scales—whence the name—fixed to the leaves and bark, and appearing like flat grey or brown spots on them. Different trees and plants are infested by different kinds of scale, and each has its distinctive name. Apples, pears, peach, nectarines, roses, camellias, oranges, lemons, acacias, palms, and oleanders, are especially susceptible to injury from them. They are destroyed by the application of strong soapy water in the proportion of 1 oz. of soap to 1 quart of water, paraffin in the proportion of $\frac{1}{2}$ gill to 1 gallon, lye of wood ashes or potash, tobacco water, and fish oil.

SLUGS.

Of slugs there are several varieties, but the most destructive in gardens are the small white and small black slugs, which bury themselves in the ground or under leaves, and come out in the night-time to feed. To destroy these, take fresh lime in a powdered state, put it into a coarse bag, and after nightfall or before sunrise, dust the ground where slugs are about : every slug touched with the smallest particle of

the lime will die at once. If the weather be wet, the power of the lime will soon be destroyed : but if the ground be strewed in the evening with fresh cabbage-leaves, the slugs will hide under these, and may be destroyed in the morning.

SNAILS.

To prevent snails crawling up walls and trees, they must be looked for, picked off by the hand, and killed. If a thick paste be made with train oil and soot, and the bottom of the wall daubed with it, an effectual barrier will be formed over which no snails will attempt to pass.

SPOT.

The disease which is known as "spot" is considered to be constitutional, hereditary, and infectious. It may also be induced by any or all of the following causes :—Imperfect drainage ; the use of crude and not sufficiently decomposed manure or leaf mould ; the presence of oxide of iron in the soil ; sudden draughts of cold air ; using water for the plants much colder than the temperature in which they grow ; allowing the sun to shine on the foliage, so as considerably to raise the temperature of the house previous to the admission of air in the morning ; permitting the drops of cold condensed vapour to drop from the roof on the same leaf, or part of a leaf, for days, perhaps weeks together ; over-watering ; using too strong manure water ; not giving water enough, or dropping water on the leaves ; escape of gas from flies ; careless fumigation and excess of moisture in the atmosphere of the house, especially if it is cold and close ; and, in fine, anything and everything that tends to check the free current of the sap through root or branches, may produce, and always intensifies, the destructive energy of this disease. By carefully avoiding all these causes, the probability is, that you will never be

troubled by the spot, and it is certain that your care will be rewarded by healthy and beautiful plants.

THIRIPS.

A small insect that infests and injures the flowers, leaves, and shoots of plants, causing them to appear spotted and warped and twisted out of place. The best remedies against thrips are the plentiful application of tobacco water or strong soap water, or any of the insecticides that are sold for the purpose of destroying insect life.

WASPS AND FLIES.

Winged insects of this description prove highly destructive to fruit, especially wall

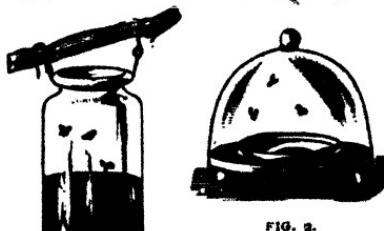


FIG. 1.—BOTTLE TRAP
FOR WASPS AND FLIES.

fruit, that is approaching maturity. Wasps will eat away the pulp under the skin and round the stone of plums, &c., until little else but skin and stone is left. The best means of protection is the simple contrivance shown in Fig. 1, which represents a bottle containing some kind of syrup, or sugar and beer mixed together, with a piece of string round its neck, from which issue other pieces, attached to hooks of wire, by which the bottle can be suspended to a branch of the tree on which the fruit is ripening. The mouth of the bottle should not be too wide, and it should possess a good shoulder, against which the insects will strike when attempting to

fly upwards before getting immersed in the syrup below. As many of these traps may be placed about a tree as may be thought necessary. The same appliance may be used within doors, but for placing on the shelves of greenhouses a glass vessel, shown in Fig. 2, standing on supports and open at the bottom, sold at prices ranging from 6d. to 1s., will be found useful. There is an interior rim rising from the orifice underneath, which, with the external portion of the contrivance, forms a circular trough, in which syrup can be placed. The wasps and flies crawl under the vessel and make their way inwards and upwards, but none that enter ever make their escape. This glass may be suspended in any convenient situation by a piece of string tied round the knot at the top.

WEED-KILLER.

This useful preparation is used in the proportion of one gallon to twenty-five gallons of water for destroying weeds on garden walks, carriage drives, stable and other yards, and for killing plantain on lawns. There is no smell with it, but care should be taken not to leave it about, whether diluted or undiluted, as it is poisonous. It is coloured to prevent mistakes, but the colour does not stain the gravel. It is said that one application will keep the places to which it is applied clear of weeds for eighteen months. It is sold in one and two gallon tins, at 2s. per gallon, including tins, but is supplied in larger quantities at lower rates. It is generally sold by chemists, and is applied with an ordinary water-pot.

WIREWORMS.

If any bed or favourite plant suffers much from wireworm, a good trap may be made by placing small potatoes with a hole in them just under the surface of the ground, at different intervals. The wireworms will,

in general, prefer this to any other food, and a daily examination will serve to entrap a great many of them.

WOODLICE.

These insects are very destructive, especially to tender seedlings in a frame. They are so numerous in general that they clear a pot in a single night as soon as the seed-leaves appear. Indeed where woodlice abound many persons are often under the impression that the seed has never come up at all, for it requires a magnifying glass to enable us to detect the minute stalks when deprived of their leaves. Woodlice congregate at the bottoms of pots in a hotbed and round the sides of the frame. They should be searched for every morning and destroyed by having boiling hot water poured upon them.

WORMS, EFFECT OF, ON PLANTS IN POTS.

While in the open ground worms are efficient drainers enough, one of the great results of their presence in pots is to render all drainage impossible. They first grind down the soil into small particles, and then work this finely comminuted earth down among the drainage. This peculiar process blocks up the outlet for the exit of water, and speedily converts the wet composts into sheer mud. Not only the mechanical texture, but the chemical composition of soils thus waterlogged and worm-worked, become so changed as to totally unfit them for the sustentation of plant life. The roots are gorged with crude food, and kept in a dirty bath of muddy water. No wonder, then, at yellow leaves, drooping buds, and sickly hues, ending in death.

WORMS IN LAWNS, TO DESTROY.
Take newly slaked lime, in the

tion of 10 lb. of lime to about 30 gallons of water. Stir it often, and then let it stand to settle. Draw off this water clear from the sediment, and with a rose watering-pot spread it freely over the lawn. The worms will come to the surface, and may be swept up with a broom. This operation is most effectual if performed in damp weather, as the worms then lie nearer the surface. It may be repeated till the worms disappear.

It should be borne in mind, however,

that worms have their use, because they consume decaying vegetable matter mingled with soil, and eject the soil at the surface of the ground in lumps or small heaps known as wormcasts. These wormcasts, being composed of earth, make, as it were, a good top dressing for lawns, &c., and renovate the soil on the surface. Air and rain are enabled to penetrate the ground through the worm holes. Further, the presence of worms in heavy soil tends to lighten it by the means explained above.

INDEX.

Garden Work.

	PAGE
A	
Appliances for Grafting and Budding	54
Arrangement of Cottage and Villa Gardens	3
Attachment of Plants to Stakes and Supports	83
Axe	25
B	
Barrow, or Wheelbarrow	25
Baskets for Garden Use	26
Billhook	26
Blanching	22
Borders	11
Bottom Heat	79
Box and Privet	15
Box Edging	12
Boxes, Tubs, etc.	81
Brooms	27
Budding, Appliances	54
Budding, or Shield Grafting	53
Bulbs, Propagation of	51
C	
Chisel	27
Cleft, or Tongue Grafting	57
Cold Pit	80
Composition of Soils	46
Composts	45
Cordon System for Fruit-trees	63
" " Horizontal, " " for Apples	63
Cottage Gardens, Arrangement of	3
" " Cultivation and Management	6
Cow Dung	46
Crops, Disposition of	9
Cultivation and Management of Cottage Gardens	6
D	
Daisy Fork	28
" Rake	28
Damping off	78
Dibble or Dibber	29
Digging	20
Divisions of the Plant, Propagation by	5
Drainage of Pots	78
Draining	19
" Implements	21
E	
Earthing-up	22
Edging for Beds and Borders	11
" Tools	30
Espalier Training	63
Evergreens, Treatment	15
Eyed Nails	31
F	
Fan, or Palmette Training	64
Fences for Garden Ground	12
Fernery	82
Fork	30
Formation and Planting	9
" Borders	11
Frames for Gardens	72
Fruit-trees, Standard form	62
" Training	63
Fumigation	28
G	
Garden Paths and Walks	17
" Nails	32
" Walls	45
Gardening, for Smoky Cities, etc.	67
Gates	13
Germination	48
Germs, Propagation by	51
Grafting, Appliances	54

INDEX.

	PAGE		PAGE
Grafting and Budding	55	Pickaxe and Mattock	38
Grass Walks	17	Privet	15
Gravel Walks	18	Propagating Box	78
Greenhouse	74	Propagation	49
Guano	47	Pruning	58
		Trees	61
H			
Handbarrow	25		R
Harvesting of Soil, etc.	46	Rake	39
Hedges	13	Reel and Line for Garden Use	39
" Clipping	15	Rollers, Garden	40
Hoes and Hocing	32	Runners, Propagation by	51
Holly	14		S
Hotbeds	70	Seed, Propagation by	50
	I	Slips, "	51
Inoculating	22	Slit Grafting	57
	K	Soils, Composition of	46
Kitchen Garden	6	Spade	40
Knives used in Garden	34	Standard Form for Fruit-trees	62
	L	Stole or Stolon	52
Labels	35	Suckers, Propagation by	51
Ladders	35	Summer-houses and Seats	19
Lawns	18	Syringe	41
Layering Plants	52		T
Shrubs and Trees	52	Thinning Out	23
Lime	47	Thorns	14
Liquid Manure Tank	48	Tongue Grafting	57
	M	Tools	24
Manure	44	Transplanting	23
Mats for Cold Pits	81	Trees, Training	63
Mixed Gardens	10	Trenching	20
Mould Scuttle	36	Trowel	41
Mowing Machine	36	Tuberous Plants	52
Mulching	22	Tubs, Boxes, etc.	81
	N	Turf Beaters	42
Nailing	23	Turf Spade or Turfing Iron	42
Name and Number Sticks	37		V
Natural Propagation	49	Villa Gardens, Arrangement	3
Netting	37		W
North Borders	11	Watering	23
	O	Water Pots	43
Offsets, Propagation by	51	Wheelbarrow	25
	P	Winter Pruning	62
Palmette Training	64	Wire Netting	38
Pests	309-323	Wooden Flower Sticks	43
	Y		
		Yew	15

INDEX.

327

Flowers, Etc.

A	PAGE		PAGE
<i>Abutilon</i>	87	<i>Buckthorn</i>	109
<i>Acanthus</i> , or Bear's Breech	87	<i>Budding Roses</i>	109
<i>Achime'nes</i>	87	<i>Bud'dea</i>	109
<i>Ac'onite</i>	88	<i>Bugloss</i>	110
<i>Adian'tum Capillis Venfris</i> , or Maidenhair Fern	88	<i>Bulboco'dium</i>	113
<i>Agapanthus</i>	88	<i>Bulbs</i>	110
<i>Aga've</i>	88		
<i>Agera'tum</i>	89	C	
<i>Al'mond</i>	89	<i>Cactus</i>	113
<i>Al'oe</i>	89	<i>Calandrin'ia</i>	114
<i>Aloy'sia</i> , or Lemon Plant	89	<i>Calceolaria</i>	114
<i>Alpine Plants</i>	89	<i>Calla</i> (<i>see Arum Lily</i>)	114
<i>Alstromer'ia</i>	90	<i>Calliop'sis</i>	115
<i>Alys'sum</i>	90	<i>Camel'lia</i>	115
<i>Amaran'thus</i>	90	<i>Campan'ula</i>	115
<i>Amaryl'lis</i>	90	<i>Canary Creeper</i>	116
<i>American Plants</i>	91	<i>Candytuft</i>	116
<i>Ampelop'sis</i>	92	<i>Canterbury Bells</i>	116
<i>Androm'eda</i>	92	<i>Cape Bulbs</i>	117
<i>Anemone</i> , or Windflower nnuals, Hardy	92	<i>Carnation, Picotee, and Pink</i>	117
<i>Annals, Half-hardy</i>	93	<i>Ceano'thus</i>	119
<i>Antirrh'i'num</i> , or Snap-dragon	96	<i>Celo'sia, or Cockscomb</i>	119
<i>Aquatic Plants</i>	97	<i>Centau'rea</i>	120
<i>Aquilegia</i> , or Columbine	98	<i>Chama'rops</i>	120
<i>Arbutus</i> , or Strawberry Tree	99	<i>Chelo'ne</i>	120
<i>Ardi'sia</i>	99	<i>Chionodox'a</i>	120
<i>Aristolochia</i>	99	<i>Christmas Rose</i>	120
<i>Armeria</i>	201	<i>Chrysanthemum</i>	121
<i>Arum</i>	99	<i>Cineraria</i>	123
<i>Asphodel</i>	100	<i>Cistus</i> , or Rock Rose	124
<i>Aspidistra</i>	100	<i>Clark'ia</i>	125
<i>As'ters</i>	100	<i>Clem'atis</i>	125
<i>Aubrieta</i>	101	<i>Clian'thus</i>	125
<i>Aucuba</i> , or Variegated Laurel	101	<i>Climbing and Trailing Plants</i>	125
<i>Auricula</i>	101	<i>Cockscomb</i> (<i>see Celo'sia</i>)	119
<i>Aza'lea</i>	102	<i>Co'leus</i>	128
		<i>Collin'sia</i>	127
		<i>Columbine</i> (<i>see Aquilegia</i>)	99
		<i>Convolvulus</i>	127
		<i>Coronil'la</i>	128
<i>Balsam</i>	103	<i>Crocus</i>	128
<i>Bear's Breech</i> (<i>see Acan'thus</i>)	87	<i>Cu'phea</i>	129
<i>Bedding Plants</i>	104	<i>Cuttings</i>	129
<i>Bego'mia</i>	105	<i>Cy'clamen or Sow-bread</i>	131
<i>Belladon'na Lily</i>	106		
<i>Bentha'mia</i>	107		
<i>Biennials, List of</i>	107		
<i>Bignonia</i> , or Trumpet Flower	108	D	
<i>Box</i>	108	<i>Daffodil or Narcissus</i>	131
<i>Brachy'come</i>	108	<i>Dahlia</i>	132
<i>Briza</i>	108	<i>Daisy</i>	134
<i>Browal'Tia</i>	109	<i>Daph'ne</i>	134
<i>Brugman'sia</i>	109	<i>Datu'ra</i>	134
		<i>Delphin'ium</i>	134

INDEX.

	PAGE	I	PAGE
Deut'zia	135	Ibe'ris	162
Dielytra	135	Ice Plant	162
Digita'lis	136	Impa'tiens	162
Dog's-tooth Violets	136	Indian Aza'leas	163
E		Inopsidium	163
Eccremocar'pus	136	Intermediate Stock	163
Echeveria	136	Ipome'a	163
Egg-plant	137	Iris	163
Erica, or Heath	137	Irish Ivy	164
Ero'dium	138	Irish Yew	164
Erys'imum	138	Isme'ne	164
Escallo'nia	139	Ivy	164
Eschscholt'zia	139	Ix'ia	165
Eulalia	139	Ixiolirion	165
Euonymus	139	J	
F		Jacobe'a	165
Ferns	130	Jacobe'a Lily	165
Flower Culture	142	Jasi'num	165
Flowering Plants	142	Jonquil	166
Foliage Plants	143	K	
Fraxinel'la	143	Kal'mia	166
Fressia	143	KaloSanthes	166
Fritilla'ria	144	Kaulfus'sia	166
Fuchsia	144	Kerria	167
Funkia	145	L	
G		Lanta'na	167
Gaillar'dia	145	La'pageria	167
Gardenia	145	Larkspur	167
Genis'ta	146	Lathyrus, or Sweet Pea	168
Gentia'na	146	Laurus	168
Gera'nium	146	Lavandula, or Lavender	168
Gesneras	148	Lavate'ra	168
Gladiolus	148	Lavender, or Lavandula	168
Gloxin'ia	149	Lemon Plant, or Aloy'sia	89
Gode'tia	149	Lepto'siphon	169
Guernsey Lily	149	Leucojum, or Snowflake	169
Gunne'ra	150	Lilium, or Lily	169
H		Lily, or Lilium	169
Harpalium (<i>see</i> Helianthus)	150	Lily of the Valley	171
Heartsease, or Pansy	150	Linaria	171
Heath, or Erica	137	Li'num	171
Helian'thus	152	Lobe'lia	172
Helichry'sum	153	Lonicera	172
Heliotro'pium	153	Lotus	173
Herbarium Perenniale	153	Lupi'nus	173
	156	Lychnis	173
Hollyhock	157	M	
Hu'mea	158	Maidenhair Fern, or Adian'tum	
Hu'mulus	159	Capillis Venfris	88
Hyacinth	159	Marigold	173
Hydran'gea	161		

INDEX.

329

	PAGE		PAGE
Martagon Lily, or Turk's Cap Lily	174	Potentilla	188
Marvel of Peru	174	Pri'mula	188
Mathiola	174	Pyre'thrum	189
Maurandya	175	Q	
Mesembryan'themum	175	Quaking Grass	189
Mignonette	175	R	
Mimul'us	176	Ranunculus	189
Mis'tletoe	176	Rhodanthe	190
Mock Orange	206	Rhododendrons	191
Money Wort (<i>see</i> Nummularia)	177	Ribbon-Planting	191
Moss Rose (<i>see</i> Rose, Moss)	177	Ribes	191
Myrtle	177	Ri'cinus	191
		Rocket	
	N		
Narcis'sus	131, 177		
Nastur'tium	178	Bourbon	
Nemo'phila	178	Boursault	193
Nerine Sarniensis (<i>see</i> Guernsey Lily)	179	Roses, China	
Ne'rium	179	Classification of	193
Nicotiana	179	Grafting	194
Noisette Roses (<i>see</i> Roses)	179	Hybrid Perpetual	194
Nummularia	179	Moss	194
Nuphar	180	Noisette	195
Nympha'a	180	Planting of	195
		Soil for, etc.	198
	O	Summer	198
Oenoth'era	180	Tea-scented China	198
Oleander (<i>see</i> Nerium)	180	S	
Opun'tia	181	Salvia	199
Or'chids	181	Saponar'ia	199
Ornithogalum	181	Saxifrage	199
Ox'alis	181	Scabious	200
	P	Schizanthus	200
Paeon'y	182	Scilla	200
Pansies (<i>see</i> Heartsease)	150	Sea Pink, or Armeria	201
Passion-Flower	182	Sedum, or Stonecrop	201
Peas, Sweet	168	Sempervivum	202
Pelargo'niums	182	Senecio	202
Pennyroyal	184	Shrubs, Deciduous	203
Penstemon	184	Silene	203
Perennials	184	Snapdragon	97
Periwinkle (<i>see</i> Vinca)	184	Snowdrop	203
Petunia	184	Snowflake (<i>see</i> Leucojum)	204
Philadelphus (<i>see</i> Syringa)	185	Sow Bread	131
Phillyrea	185	Speedwell	213
Phlox	185	Sphagnum	204
Picotees	117, 186	Spiraea	204
Pinks	117, 186	Stocks—Mathi'ola	204
Plumbago	187	Stonecrop (<i>see</i> Sedum)	201
Polyanthus	187	Strawberry Tre'e	99
Polygonatum	187	Sweet Peas	168
		Sweet William	205
		Syringa	205

INDEX.

T	PAGE		PAGE
Taco'snia	206	Vin'ca	214
Tagetes (<i>see</i> Marigold)	206	Violets	214
Thu'ja	206	Virginian Creeper	216
Thunder'gia	206	" Stock	216
Tradescantia	207	Visca'ria	217
Trailing Plants	125	Vis'cum	217
Triteleia	207		W
Trito'me, or Kniphofia	207	Wallflower	217
Tropæolum	208	Weigela, or Weigelia	217
Trumpet Flower	108	Windflower	92
Tu'be rose	208	Window Gardening	218
Tu'lips	209	Winter Cherry	222
Turk's Cap Lily	174	Wistaria	222
			U
U'lex	211	Xanthorhi'za	222
Urti'ca	211	Xeran'themum	223
Uvula'ria	212		X
		Yuc'ca	223
			Y
Vaccin'ium	212	Zauschne'ria	223
Vale'rian	212	Zie'ria	223
Vallotta	212	Zin'nia	223
Variegated Laurel	101	Ziz'yphus	224
Verbe'na	212		Z
Vero'nica, the Speedwell	213		
Viburnum	213		

Fruit, Etc.

Apple	279	Lemon	295
Apricot	279	Medlars, Mulberries, Quinces, etc.	293
Blackberries	280	Melons	294
Bush Fruit	280	Mulberry	295
Cherry	282	Nectarines	295
Cottage Gardens	282	Orange and Lemon	295
Currant	283	Orchards	295
Figs	284	Pears	299
Filberts	285	Pineapple	299
Fruit, Gathering	285	Plums	302
" Storing	286	Quince	302
" Trees, Dwarf	286	Raspberry	302
" " to Plant	287	Strawberry	303
Gooseberries	290	Vines	304
Grapes	293		

INDEX.

331

Vegetables, Etc.

	PAGE	PAGE	
Alexanders	227	Jerusalem Artichoke (<i>see A.</i>)	227
Artichokes, Globe	227		
Jerusalem	227		
Asparagus	228	Kale (<i>see Borecole</i>)	253
Auber'gine or Egg Plant	230	Kidney Beans (<i>see Beans</i>)	254
Balm	231	Kitchen Garden Seeds	254
Basil	231	Kohl Rabi	255
Beans,	231	Leeks	255
French or Kidney	232	Lettuce	256
Runner	232	Mint	257
Beet, Red	233	Mushrooms	257
Spinach or White	234	Mustard	258
Borecole	234	Onion, Potato	260
Broccoli	235	Onions	258
Brussels Sprouts	236	Parsley	260
Cabbage	236	Parsnips	261
Red or Milan	237	Peas	261
Savoy	237	Potatoes	263
Tribe, Seed-bed for	238	Pumpkins	265
Cap'sicums	238	Radish	266
Cardoons	239	Rampion	267
Carrots, Early Horn	239	Red Beet	267
Sowing	240	Rhubarb	267
Cauliflower	240	Rosemary	268
Celeriac	242	Rue	268
Celery	242	Sage	268
Chervil	244	Salsafy	268
Chicory, Savory or Wild	244	Savoy Cabbage	269
Endive	244	Scarlet Runners	269
Chilis	244	Scorzonera	269
Chives	245	Seakale	269
Clubbing in Cabbages	245	Seeds for Kitchen Garden	270
Corn Salad	245	Seeds, Storing	270
Cottage Gardens	246	Shallots	270
Couve Tronchuda	248	Skirret	270
Cress, Mustard, etc.	249	Spinach	270
Crops, Rotation of, etc.	246	New Zealand and Perennial	272
Cucumbers	249	Sweet Herbs	272
Egg Plant, or Auber'gine	230	Tansy	272
Endive	250	Tarragon	272
Fennel	251	Thyme	272
French Beans (<i>see Beans</i>)	251	Tomato	273
Garlic	251	Turnips	274
Garnishing, Herbs for	252	Vegetable Marrows	274
Gourds	252	Vegetables, Classification	274
Herb Garden	252	Storing	274
Herbs for Garnishing	252		
Horseradish	253		

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